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An Index to the Sixty-third Volume of THE RAILWAY GAZETTE *covering the issues from July 5, to December 27, 1935, is presented as a Supplement to each copy of this week's issue.*

G.W.R. Centenary Honours

THE New Year Honours List has a special railway interest. In connection with the recent centenary of the Great Western Railway, His Majesty has announced his intention of conferring several well merited honours on representative members of the staff of that company. The British Empire Medal for meritorious service is being awarded to Mr. W. E. Butland, Bridge Inspector, Engineering Department, Plymouth; Mr. Edward Hurley, Passenger Guard, Traffic Department, Paddington; and Mr. W. R. Morris, District Inspector, Goods Department, Birmingham. Mr. F. C. Sheldon, Senior Locomotive Running Inspector, is awarded the M.B.E. Mr. J. F. Lean, Principal Assistant to the General Manager, is awarded the O.B.E. Mr. F. R. E. Davis, the Secretary, who worked indefatigably in organising the centenary celebrations and the centenary film, is awarded the C.B.E. The General Manager, Sir James Milne, C.S.I., received the honour of Knighthood in 1932, and is now awarded the K.C.V.O. The selection of Mr. Ralph Cope, the Chief Accountant, for the honour of Knighthood, is a particularly happy one, not only on account of his personal services, but because he is the senior Great Western officer as regards length of service, and also the doyen of British railway officers. The office of railway accountant is not one that appeals to the imagination of those interested in railways to the same extent as that of locomotive engineer. But the accountant, like the general manager, must keep closely in touch with all the businesses and undertakings comprised in a modern railway. He and his staff are ubiquitous and are concerned with the routine working of every department; finally collating the result of all their efforts into the annual report and accounts. In fact, the chief accountant is, or should be, a liaison officer between all departments and financial adviser to the general manager and board of directors.

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Christmas Eve on the Underground

Christmas Day in the workhouse was a condition which, in our earlier years, we were counselled to avoid, although now that the workhouse has become the public assistance institution, we do not doubt that the festivities around the hearth of the guardians reach as high a pitch of elegance and refinement as in homes less sheltered from the winds of chance. The gift of mingling celebration with austerity seems today to have shifted to London Transport, for after a journey on the Underground passed in counting the number of copies displayed in our carriage of the board's imperious blessing—"A Merry Christmas to all our passengers"—we alighted at Charing Cross to find in operation one of the traps periodically laid for those who see in the unguarded labyrinths of this station an inducement to cheap travel. We did not observe whether, because it was Christmas Eve, the customary penalties were revised in favour of some seasonable forfeit, such as requiring delinquents to bow to the wittiest and kneel to the prettiest of the assembled inspectors; we saw enough, however, to convince us that the doorstep of the board's headquarters is not to be recommended to the returning prodigal, the abandoned waif, or any of the other traditional figures who expect a seasonable licence.

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Two Week's Traffics

Christmas Day in 1935 fell on a Wednesday, whereas in 1934 it fell on a Tuesday. In 1934, consequently, the Christmas holiday traffic was spread over two weeks as some of it had begun on the previous Saturday and Sunday, but in 1935 it was mainly confined to one week. To appreciate the holiday traffic position in the two years it is necessary to compare the two weeks' totals in both years, and this has been done in the accompanying table. Passenger train traffics were down in the 51st week and up in the 52nd week in 1935, merchandise receipts were generally up in both weeks, and coal earnings improved in both weeks.

	51st and 52nd Weeks				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 7,000	+ 49,000	+ 27,000	+ 93,000	+ 891,000	+ 1·49
L.N.E.R ..	—	+ 25,000	+ 18,000	+ 43,000	+ 198,000	+ 0·45
G.W.R... ..	− 1,000	+ 20,000	+ 28,000	+ 47,000	+ 274,000	+ 1·10
S.R.	+ 1,000	+ 1,000	+ 9,000	+ 11,000	+ 188,000	+ 0·94

Total receipts of the four companies together for the 52 weeks of 1935 are estimated at £150,797,000, an increase of £1,551,000, or 1·04 per cent. Passenger train traffics are up £1,184,000, merchandise receipts show a rise of £236,500 net, and coal class receipts an improvement of £130,500 net.

* * * *

The Railway Finance Corporation

Events moved rapidly in connection with the Government guaranteed loan for railway schemes following the granting of the Royal Assent to the Railways (Agreement) Act on December 20. Later the same day the L.M.S.R. announced the placing of orders under the scheme for 369 steam locomotives and 270 passenger carriages totalling £2,800,000 in value and embracing two of the items in the L.M.S.R. part of the programme of reconstruction

and improvement. Subsequently some particulars became available from the L.N.E.R. and these, together with the details of the L.M.S.R. contracts we set out in full on later pages. Then on December 24 the Railway Finance Corporation Limited was incorporated as the finance company envisaged by the scheme. Its share capital is nominal (£100 in £1 shares) as its immediate purpose is to raise loans not exceeding £26,500,000 upon which the Treasury will guarantee the principal and interest. The task to be undertaken by the new corporation is described as financing the G.W., L.M.S., L.N.E., and Southern Railways or any other transport undertaking in any manner approved by H.M. Treasury, &c. The directors are: Mr. Walter Kennedy Whigham, a Director of the Bank of England and of the L.N.E.R.; Sir Josiah Stamp, Director of the Bank of England, and Chairman and President of the Executive of the L.M.S.R.; Mr. Charles J. Hambro, a Director of the Bank of England and other banks, and a Deputy Chairman of the G.W.R.; Mr. Edward Holland-Martin, a Director of the Bank of England; and Mr. Kenneth Oswald Peppiatt, Chief Cashier of the Bank of England. It has already been announced that there is a close resemblance between the financial arrangements of the present (£30,000,000) main-line railway scheme and those of the earlier London area agreement, and this will be seen by comparison with the details of the London Electric Transport Finance Corporation Limited which we published on July 19 last.

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Overseas Railway Traffics

Although the Canadian Pacific for the 51 weeks of 1935 has an increase in gross earnings of £769,400, its net earnings from January 1 to the end of November show a decrease of £424,000, as compared with a decrease of £427,000 at the end of October. Amongst Argentine railways the best showing during the past fortnight has been that of the Central Argentine which has added £32,983 to its previous increase. On the Buenos Ayres & Pacific the corresponding increase in the two weeks has been £24,720, and on the Buenos Ayres Western £6,698. The Buenos Ayres Great Southern has, on the other hand, added during the two weeks £8,400 to its previous decrease.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
		£	£	£	£
Buenos Ayres & Pacific	26th	80,729	+ 11,836	1,945,930	+ 156,037
Buenos Ayres Great Southern	26th	133,020	– 3,770	3,116,706	– 52,774
Buenos Ayres Western	26th	44,418	+ 481	1,071,595	– 11,178
Central Argentine	26th	125,129	+ 18,477	3,042,383	+ 61,680
Canadian Pacific	51st	530,600	+ 23,800	25,245,200	+ 769,400
Bombay, Baroda & Central India	38th	235,875	– 18,450	5,697,825	+ 3,600

Brazilian railways for the 51 weeks of 1935 are up in currency, but down in sterling when calculated at the free market rate, the respective decreases being Great Western £58,200, Leopoldina £205,450, and San Paulo £104,662.

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Rest and Be Thankful

A real nightmare was once defined by a facetious friend of ours as a long night railway journey. We ourselves have experienced such nightmares, but not lately on British railways where the efforts of those responsible for the design and running of the latest types of sleeping cars have resulted in such comfort that the passenger is lulled into dreamless sleep. The comfort of the berths whether in the third class or the first class compartments could not be excelled at home, and a first class cabin is indeed, except in the matter of size, a little oasis of luxury. More than the mere internal equipment is, however, demanded. The car must run smoothly and quietly, or sleep, no matter what the other amenities may be, becomes elusive. In this respect the latest designs of sleeping cars running on the main lines of this country leave little to be desired. This was very fully brought home to us when recently we made a night journey on the L.M.S.R. in a car of the newest pattern, and arrived at our destination rested and thankful. The conclusion we arrived at was that anyone who complained that his sleep was interrupted by noise or unsteady running must either be suffering from severe indigestion, a guilty conscience, or some other affliction over which the company has no control. The most diligent and costly research is responsible for this satisfactory state of things and, speaking with extensive knowledge of sleeping car travel both here and on the Continent, we have no hesitation in saying that the new L.M.S. cars, of which an illustrated description appeared in our issue of August 23 last, rank among the best to be found anywhere in Europe.

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Locomotive Coal Prices

Arising out of the miners' demands for increased wages, it was recently announced that the price of coal would be raised as from January 1, 1936. The coal owners are experiencing some difficulty in their wage negotiations, however, because a large number of contracts, covering a substantial tonnage of coal, will not expire for a considerable time ahead. Representations were, therefore, made by the Mining Association of Great Britain to the railway companies, in common with other large consumers of coal, that they should voluntarily agree to the proposed increase in price, ranging from 1s. to 2s. per ton according to the quality of the coal, being applied to all existing contracts. Careful and sympathetic consideration has been given by the railway companies to this request, and their reply to Sir Evan Williams, printed on page 33, emphasises the very essential difference which exists between the position of the railway companies and the public utility companies. The latter can more or less automatically transfer the increase to the consumer, but the railway companies are not in such a favourable position, and, for the reasons detailed, are unwilling to seek authority to increase their rates. Moreover, the companies will have to bear a substantial proportion of the extra cost which is being voluntarily undertaken by the electric light and power, gas and iron and steel, &c., undertakings, and, having regard to their already meagre net revenues, they are unable to comply with the Mining Association's request. It should be borne in mind, of course, that upon the expiration of the current contracts, the companies will have to pay any increased price which may be operative at the time.

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Chinese Railway Expansion and Market

The remarkable activity in Chinese railway development is once more referred to in an article from a correspondent on another page of this issue. So important is this subject, that we decided in October, 1934, to publish a résumé of the construction works completed from 1928 to that date, and to initiate an annual review of the situation, including an up-to-date map indicating the new lines and those under construction and projected. In our issue of November 1 last, we published the second of our reviews together with a leader on the subject, emphasising the phenomenal rate of expansion and linking it with the question of correspondingly increasing demands for imports of rolling stock and other materials, and giving, moreover, a list of the principal orders placed in this country by the Chinese Ministry of Railways during the preceding twelve months. Attention was also drawn to the type of equipment demanded or likely to be required. With the closer relations daily in evidence between North China and Manchukuo, our implied warning in connection with

the order for coaching stock recently placed with Manchukuo by China appears to have been timely, and if British firms are to retain their share of orders in this rapidly expanding Chinese market we think that too much attention cannot be paid to the subject generally by all both directly and indirectly concerned.

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London Transport Goods Traffic

In the popular mind the activities of the London Passenger Transport Board are usually confined to the business indicated by its title, namely the carriage of passengers, and therefore the reminder given recently by Mr. George Hally, its Operating Manager (Railways), in a paper before the York Railway Lecture & Debating Society, was timely. He pointed out that, although the goods business handled by the board's railways was comparatively small, it was not without its interest, and that at Metropolitan Line stations some 400,000 tons per annum were dealt with, in addition to 300,000 tons at stations operated jointly by the L.N.E.R. and the L.P.T.B. For the conveyance of this tonnage the board runs twenty steam trains a day. Furthermore, traffic amounting to between 3,000,000 and 4,000,000 tons is carried by trains of the main-line railways over the board's "widened lines" between Paddington and Smithfield; St. Pancras junction and Whitecross Street or Farringdon junction; and King's Cross junction and Farringdon junction. These "widened lines" afford the main-line railways a convenient means of reaching goods stations in the heart of London and provide a direct route for traffic between the north and south of England.

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New Locomotive and Rolling Stock Contracts

Those who, on occasions, criticise the railways for spending too much on experimental types of locomotives, streamlining and so forth, and assert that the building of too many different classes of locomotives and vehicles is undertaken, thus impeding the progress of the more economical principle of standardisation, will find little in support of such contentions in the details of the L.M.S.R. contracts, placed under the Government Guarantee Loan, particulars of which will be found on pages 20 and 21 of the present issue. No fewer than 369 steam locomotives are to be built during the next two years, all of standard types, one order alone comprising 227, 4-6-0 type, mixed traffic engines with tenders, similar in all major respects to those of the same class already in service. The work performed by the existing engines and their economy of maintenance has formed the basis upon which the decision to build the large number now ordered has been founded. This is evidence indeed of the confidence reposed by the Chief Mechanical Engineer's and the Operating Departments in the efficiency of this design of locomotive for all that is required of it. The remaining engines, 142 in number, are almost equally divided between the 2-8-0 heavy freight type with tender and 2-6-4 two-cylinder passenger tank engines. The actual distribution of the orders *i.e.* to only three contractors, although naturally very disappointing to the firms who have been left out, must from the company's point of view have had the advantage of considerably reducing the over-all cost of the 369 locomotives. The rolling stock programme of the L.N.E.R. is also of a comprehensive order, for, although that company is arranging for only 10 engines under the Government Loan scheme, its ordinary programme provides for no fewer than 207 locomotives, 1,154 passenger coaches, and over 11,000 wagons.

The G.W.R. Parallel

On the G.W.R. a decision, based on the company's ordinary programme as apart from the Government Guarantee Loan scheme, has been reached to add considerably to the numbers of locomotives built to designs which have been well tried out and proved successful during the past few years. No one with a knowledge of the subject could doubt the wisdom, as more engines are wanted, of adding to the number of "Castles" and "Halls," and what is of equal interest is that 100 new 4-6-0 locomotives of the general utility category are to be created by converting a corresponding number of 2-6-0 type engines, which, as altered, will have larger boilers. These engines will have smaller coupled wheels than the "Hall" class engines, namely 5 ft. 8 in. as against 6 ft. 0 in. which should give them a wide range of utility, beginning, as it were, where the "Hall" class may be said to leave off. Again, 90 0-6-0 new tank locomotives are to be built similar to those already in service, thus confirming once more the suitability of existing types for the work that lies ahead. In regard to coaching stock it is good news for passengers on the G.W.R. that a further 172 new vehicles similar in design to the new luxury Cornish Riviera coaches are included in that company's programme, whilst more of the centre vestibule cars, designed specially for catering for pleasure parties, will be built during the present year. This programme of locomotive and rolling stock construction differs from those referred to in the preceding note in that the whole of it will be carried out at the company's works at Swindon instead of being placed out with contracting firms. It is, indeed, the largest undertaken by the G.W.R. for some years past, involving as it does the building of 225 locomotives, 302 passenger coaches, and 3,500 freight wagons.

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Proposed Centralised Railway Tool Room

An interesting proposal was made by Mr. A. H. Black in his paper entitled "A Review of Tool Room Practice on an Argentine Railway," read at a meeting of the South American Centre of the Institution of Locomotive Engineers. Discussing possible developments, the author outlined a scheme whereby the necessary maintenance under the new conditions could be obtained at a minimum expense. The scheme calls for the creation of a central tool room jointly owned by the railway companies, for manufacturing and maintaining a range of cutting tools. This jointly owned tool room would, it is suggested, be located at a central point as convenient as possible for all the railway repair shops interested. Agreement on a standard of cutting tool forms by the Standardisation Committee is taken for granted, an assumption which in this case is not unreasonable, as agreement on the question is practically universal; the tools to be manufactured would be butt-welded, owing to the economy effected on expensive cutting steels, and would have a cutting point of high-speed steel superior to that in common use. This would give slightly higher cutting speeds on existing machine shop plant, which does not embody the improvements necessary to cope with the new alloys. These tools, after despatch to the various interested parties, would not be seen again in the central tool section until it was necessary to weld on a new cutting point. In the course of the discussion which followed the paper, one of the speakers remarked that he thought the author too sanguine in his idea that a central tool room would meet requirements not only from the point of view of standardisation of practice, which implies similar shop equipment and methods in all workshops concerned, but also from the point of view of capacity.

Centenaries of 1936

A HUNDRED years ago money was plentiful in Great Britain and investors were anxious to find a medium which promised a good return on their capital. Two more decades were to pass before the limited liability company, as we now know it, was introduced, and the investing public turned its attention, therefore, to railway companies, which, being statutory undertakings, offered a liability limited to the nominal value of the share and so avoided the perils of a holding in an unlimited partnership. The continued success of the Liverpool & Manchester Railway held out the promise of satisfactory dividends, and thus began the movement which resulted in the first railway boom. It was comparatively shortlived and may be said to have spent its force by the time Queen Victoria succeeded to the throne at the death of William IV on June 20, 1837. This boom left us the legacy, however, of the early sections of our main line railway systems. Some idea of this may be gathered from the facts that during the session of 1836 no fewer than 35 Acts of Parliament relating to railways received the Royal Assent; 29 were for new companies and authorised the construction of 955½ miles of line. During 1836 and 1837 Parliament sanctioned railway works estimated to cost more than £36,000,000, which total compared with but £19,000,000 during the years 1826-1835 inclusive. The most important of the newly-formed railway companies of 1836, showing in parentheses the date of incorporation, were as follow: Birmingham & Gloucester (April 22); Birmingham & Derby Junction (May 19); Bristol & Exeter (May 19); Taff Vale (June 21); South Eastern (June 21); Midland Counties (June 21); York & North Midland (June 21); Hull & Selby (June 21); Birmingham, Bristol & Thames Junction, afterwards West London (June 21); Cheltenham & Great Western Union (June 21); Eastern Counties (July 4); Manchester & Leeds (July 4); North Midland (July 4); Northern & Eastern (July 4); Great North of England (July 4); Sheffield & Rotherham (July 4); Commercial, afterwards London & Blackwall (July 28). The largest of the new schemes was the Eastern Counties which proposed to build 126 miles of line from Shoreditch to Colchester, Norwich, and Yarmouth. This company's lines, and also those of the London & Blackwall and the Northern & Eastern, were built to the 5-ft. gauge. Two new Scottish railways of 1836, the Dundee & Arbroath and the Arbroath & Forfar (both incorporated on May 19), adopted the 5 ft. 6 in. gauge; of two new Irish lines, the Ulster (May 19) was built to 6 ft. 2 in., and the Dublin & Drogheda (August 13) to the 5 ft. 3 in. eventually standardised in Ireland.

As might be expected from the comparative paucity of railway promotions in the immediately preceding years, the new lines opened in 1836 were relatively few and mainly unimportant. Perhaps the most notable was the London & Greenwich, the first steam railway in the Metropolis, which opened its initial section (from Spa Road to Deptford) on February 8, and was formally inaugurated on December 14 by the Lord Mayor of London on the completion to London Bridge station. In all some 65½ miles of standard gauge railway were opened in England during the year, including the horse-worked Grosmont-Pickering section of the Whitby & Pickering Railway (May 26); the first portion—9¾ miles between Hendon and Haswell—of the Durham & Sunderland Railway (August 9); the important extension of the Liverpool & Manchester Railway into Lime Street station (August 15); and further sections of the Newcastle & Carlisle Railway, namely, Blaydon-Derwenthaugh (June 11), Hexham-Haydon Bridge (June 28), and Carlisle to Blenkinsopp Colliery at Greenhead (July 9). In addition, the Festiniog Railway, the famous pioneer narrow-gauge line, opened its 1 ft. 11½ in. gauge track with animal traction in April. Canada saw its first public railway with the opening of the Champlain & St. Lawrence Railroad on July 21. In the U.S.A. an opening worthy of note was the Brooklyn-Jamaica section of the Long Island Railroad. One more European country was added to the growing list of railway-served communities during 1836 when a section of the first Russian line was opened. This railway—built by the Petersburg & Tsarskoe Selo Railway Company—was opened between Pavlovsk and Tsarskoe Selo with horse traction on October 9, and locomotives were introduced on November 22, but it was not until October 30, 1837, that the completed line was inaugurated. Incidentally, some slight discrepancies regarding this railway in standard works of reference may be explained by the difference between the Russian and the reformed calendars.

Whereas the men who were taking an active part in railway development a century ago were mainly engineers, engaged in designing and building up the new industry, there were born in 1836 celebrities destined to become prominent on the financial side. Chief amongst them was Jay Gould, the centenary of whose birth occurs on May 27. Gould took advantage of the American railway panic of 1857 to buy a controlling interest in the Rutland (N.Y.) Washington Railway, and became President of the Erie Railroad, dealing in railway stock to enormous profit. The Union Pacific, Missouri Pacific, Wabash, Texas Pacific, St. Louis & Northern, and St. Louis & San Francisco Railways were all controlled by him. Gould was accused of selling forty million dollars' worth of Erie Railroad stock, and keeping the money himself, and his manipulation of the gold market in order to bring increased freight to the railroads ruined farmers and investors. By 1880 he controlled one ninth of the track in the United States. Another American born in 1836 (on December 6) was Charles Frederick Chandler, who published in 1865 his "Report on Water for Locomotives." A further overseas celebrity born in 1836 who made a fortune in railway development (in Russia) was Jean de Bloch, a Polish Jew. He was also an optimist, for he wrote to prove that war under modern conditions was impossible! Of a practical rather than a manipulative genius was Sir John Wolfe-Barry, the famous engineer, born on December 7, 1836, and best known, perhaps, as the designer of the Tower Bridge. In his early career he was engaged as Resident Engineer under Sir John Hawkshaw on the bridges and stations of the Charing Cross and Cannon Street extension of the South Eastern Railway, and by himself on the Lewes & East Grinstead Railway; Earl's Court station; the Ealing and Fulham extensions of the Metropolitan District Railway; St. Paul's station; the completion of the Inner Circle; some South Wales railways; railways in Argentina; the Glasgow Central Railway; and the Lanarkshire & Dumbartonshire Railway. He was consulting engineer to several of the leading lines, and was author of "Railway Appliances" and "Railway and the Locomotive." On May 31, 1836, was born Francis William Webb, who was connected with the L.N.W.R. for forty-five years, and was a famous engineer and inventor; he is remembered chiefly for his use of compound locomotives. On November 9 Arthur Charles Humphreys-Owen, Chairman of the Cambrian Railways Company was born, and seven days earlier James Henry Cotterill, author of "The Steam Engine Considered as a Thermodynamic Machine." The Right Hon. Evelyn Ashley was born on July 24 a century ago. He became Parliamentary Secretary to the Board of Trade, and Under-Secretary of State for the Colonies, and was Chairman of the Railway Passengers Assurance Company. Another minister born in 1836 (on February 11)

was the famous Earl Brassey, a nautical expert who held office under Gladstone, and moved for a Select Committee on the Euphrates Valley Railway in 1871. The Euphrates Valley Railway recalls Sir Charles William Wilson, the centenary of whose birth occurs on March 14. Wilson was in command of the expedition which made desperate efforts to force a way through to the relief of Gordon at Khartoum, but arrived too late. His earlier career was spent in military surveying, and he translated Baron Kuhn's "Strategical Importance of the Euphrates Valley Railway." He was Director-General of the Ordnance Survey.

The famous railway engineer, Sir George Barclay Bruce, was apprenticed to Robert Stephenson Co. in 1836; and Sir Robert Rawlinson also entered the service of the company, and was engineer on the London & Birmingham Railway. Thomas Brassey settled in London that year on a railway contract (the prelude to his contract for the Great Northern Railway); Sir John Hawkshaw became a Member of the Institution of Civil Engineers; and another famous railway engineer, Sir Charles Lanyon, was appointed Surveyor of County Antrim. Beattie's works for the manufacture of every description of railway vehicle, and the ironwork connected therewith, were established at Liverpool in 1836. Mention has already been made of the opening of the Champlain & St. Lawrence Railroad, and it is a coincidence that, in the same year that Canada had its first railway, Sir John Alexander Macdonald (who became first Prime Minister of Canada and arranged the contract for the construction of the Canadian Pacific Railway) was admitted to the Bar. William Kingsford (who built part of the Grand Trunk Railway in Canada) joined the first Dragoon Guards that year; and Sir James Cosmo Melvill, a famous railway director, became Chief Secretary of the East India Company. Other railway appointments of note in 1836 were those of Edward Woods as Chief Engineer of the Liverpool and Manchester Railway; Peter William Barlow (the builder of the old Lambeth suspension bridge and of the Tower Subway—the first tube in the world) as Resident Engineer under Sir William Cubitt on the South Eastern Railway; and John Braithwaite as Engineer-in-Chief of the Eastern Counties Railway—the last named was associated with Ericsson in that year in the invention of the screw propeller. The final name in our list is of the greatest importance, and will not be allowed to pass unnoticed. On January 19 occurs the bicentenary of the birth of James Watt. In 1784 Watt patented and published an invention of a locomotive engine, but, as is well known, he did not put into practice this important application of steam power.

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Passenger Fares—1936

IN January last we expressed the view that the policy of reduced passenger fares, enlarged facilities, and freedom from restrictions would prove extremely popular, and enable the companies to secure at least an appreciable increase in their passenger revenue during 1935. It is gratifying to be able to record that passenger train receipts during the year rose by over £1,000,000 as compared with 1934 and, although the extent to which the simplification and reduction of fares as from January 1, 1935, stimulated the growth of passenger rail travel during the past twelve months cannot be accurately determined, it is reasonable to assume that they materially contributed to the increase. Monthly return tickets have proved extremely popular with the public by reason of their reasonable cost, one month's availability, freedom from any restriction as to train service, as well as their useful break of journey and alternative route facilities. For various reasons, however, they have so far been subject to minimum fares of 3s. 9d. first class and 2s. 6d. third class, representing journeys up to 15 miles, on the Great Western and the two northern companies, and 7s. 6d. first class and 5s. third class on the Southern Railway.

The L.N.E.R. and L.M.S.R. have been experimenting during 1935 by abolishing this minimum fare in Lancashire and Yorkshire, with the idea of encouraging travel for short distances. While the results so far are not conclusive, they have justified the continuance and extension of the experiment, and from January 1, 1936, the minima are abolished over a much wider area in the North of England, and also by the G.W.R. and L.M.S.R. in a large area in South Wales. This further simplification of the fares will, we feel sure, prove acceptable to the public. This constitutes the only change so far proposed by the companies in their passenger policy during 1936, as, while the lowering of first class reduced fares from 66·7 per cent. to 50 per cent. over the corresponding third class fares has increased first class travel sufficiently to justify the continuance of the reduction, circumstances are not yet propitious for granting a similar concession in respect of first class ordinary fares.

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The Railway Colour Question

IN the colour plate on page 16a of this issue we present a sequel to the discussion raised at the general meeting of the Southern Railway in 1935 regarding suitable liveries for the company's locomotives. The prevailing shade of green was criticised by a shareholder on the grounds that it rapidly degenerates into dinginess in service, a charge which was tacitly admitted by the Chairman's reply that the adoption of a more lively shade was being considered. The debate on liveries was taken up in the pages of our associated monthly contemporary, *The Railway Magazine*, from the current issue of which our colour plate is reproduced. The artist, Mr. M. Secretan, has put forward three suggestions for a revised Southern locomotive livery, and his work illustrates an article in our contemporary in which the painting of engines and rolling stock on British railways both immediately before the war and since the grouping is dealt with at length, the pre-war schemes being also set out in a tabular form where they find a permanence rarely achieved when they were exposed first to the ravages of the weather, and later to the tricks of the memory. The plate is from a photograph by Mr. O. J. Morris of one of the "Remembrance" class 4-6-0 locomotives converted from the L.B.S.C.R. Baltic tank series.

The persistence of interest in railway liveries indicated by the discussion at the Southern Railway meeting already mentioned is of particular significance at the present time. Today, railways in this country are tending to exercise their artistic ingenuity upon the painting of stations, and distinctive liveries in this respect are to be adopted for various branch lines of the L.N.E.R. Before the war, the situation was reversed, and the care lavished upon locomotives was in some cases proportional to the neglect accorded to the decorative requirements of stations. The present attitude is undoubtedly the more acceptable to the public, which asks little of the locomotive but that it should conform to the standards of cleanliness and smartness maintained by the average private motorcar. Upon the places where the public waits and assembles to travel by rail, however, it has pronounced views, and to watch from a bare and grubby waiting room, the arrival of a train headed by a locomotive upon which painter and cleaner have exercised the last refinements of their skill, must have bred a bitterness against railways in general, and against chief mechanical engineers with artistic instincts in particular. The public abhors drabness, and

it was for the avoidance of that rather than for a return to elaboration that the Southern Railway shareholder was pleading.

The workmanlike appearance of all Mr. Secretan's schemes appeals to us as their strongest recommendation. It will be noticed that he has not put forward an alternative green for Southern Railway engines, contenting himself with reproducing the present colour in its rarely seen perfection. To choose another and brighter shade of this immensely popular colour without encroaching upon that of the L.N.E.R. would be a difficult task. The green of the L.N.E.R. lifts up the heart like a sunny landscape, and is actually improved by strong light. It looks well on posters, and must be a most valuable publicity asset, but imposes, of course, a proportionately arduous responsibility upon the cleaning staff. A Great Western "King" may be a closer approximation to an average of all the greens of nature, but an L.N.E.R. Pacific adds thereto an Arcadian touch that might cause the sophisticated dwellers in the lush West Country to smile, although it is no doubt very heartening to the men and women of Leeds and Bradford. In his last suggestion, Mr. Secretan veers towards a Stroudley yellow (or, as its inventor preferred to call it, an "improved engine green"), and brings back the polished chimney cap. He has not, however, revived the elaboration of lining and lettering of which the memory alone brings a reverent hush to the voice of the Brighton enthusiast; this might command less respect in the present age of realism. In any case, the wonders of the Stroudley livery belonged to Brighton as much as do the Pavilion, Aquarium, or any of the other ornate and incredible phenomena connected with the resort, and its appearance at Bournemouth or Exeter might not be appreciated. Perhaps Mr. Secretan's blue suggestion will earn the widest approval, for blue, like green, is a colour of Nature. In this particular example the beautiful and uniform proportions of the plain Gill Sans lettering stand out suggestively.

* * * *

Christmas Traffic Delays

SO long as there are intermittent traffic peaks far beyond the day-to-day normal, it is inevitable that some inconvenience must be suffered by the travelling public at such periods. The traffics that had to be carried by the railways this Christmas were heavier than ever, and the conditions of railway operation were, particularly in some areas, almost unprecedentedly difficult. Fog, frost, and bitter cold played their part in diverting much unexpected traffic from road to rail; in necessitating slow running with consequent delays to trains; in freezing pipes and signals, and in coating the ground with ice, so making the lot of the railwaymen unusually hard and hazardous, not only in preparing trains for their passengers but also in almost every phase of their duties; and in taking an unusually heavy toll of the staff in illness. In all these circumstances it is perhaps less extraordinary that there were heavy delays on some lines than that on others the delays were comparatively light, and those who suffered inconvenience at least suffered it in safety. While the problem of peak traffic remains, it can be eased mainly by the encouragement of every member of the railway staffs to do his best and to use his initiative to the utmost, but not, of course, without discretion. There is certainly room for improvement here; instances have been reported to us of railwaymen shirking responsibilities the shouldering of which might have eased the lot of whole trainloads of passengers. On the other hand we have learnt with pleasure of many instances of resource and enterprise, the results of which were very appreciably to ease the traffic situation. The men who thus responsibly exercised initiative deserve well, and, although they cannot be specified and may not be directly rewarded, they have the satisfaction that comes of tasks well done. In the latter category may be cited the exploits of enginemen in charge of trains that were behind time. In our news pages will be found instances of enterprise in which much time was regained, with, doubtless, benefit not only to the trains concerned and their direct connections, but also to following trains.

Devotion to duty also characterised the staff of the Great Western Railway, which suffered such serious disorganisation on the days immediately preceding Christmas that it has been the subject of correspondence in the press. A most unfortunate combination of circumstances was responsible for these conditions. Apart from the widespread and at times extremely dense fog, and the bitter cold, together imposing those obstacles to which we have already referred, there were two circumstances unprecedented and unlikely to recur which contributed towards the breakdown. Owing to the threat of a coal strike, abnormal movements of coal from South Wales had to be handled just before Christmas; the coal trains not merely occupied running lines and by the weather conditions aforementioned became subject to heavy delays, but—because of the general increase in passenger traffic—they could not all be disposed of, and many sidings normally required for stabling coaching stock were occupied by the coal wagons. The other contribution to the trouble was the fact that the main London carriage depot at Old Oak Common is in process of enlargement, and, during its present transition stage, some of the accommodation is necessarily in the hands of the contractors. While these circumstances cannot be expected to mollify a travelling public that suffered discomfort and inconvenience at a time when it had hoped for happiness and general good will, yet we feel they ought to be placed on record. It may be assumed that the experience of the Great Western at Christmas has brought home to the management the possibility of undertaking certain measures to deal with future emergencies. The loud speaker, for example, was used to very good effect in directing the crowds at certain other London stations. All progress is the result of trial and error, and a repetition of such unusual disorganisation as travellers suffered need not be feared.

Christmas on the G.W.R.

The following letter to the Editor of *The Times* appeared on January 1, following correspondence regarding traffic delays on the G.W.R. on Christmas Eve:—

SIR,—The G.W.R. or any other transport firms have not yet reached the stage when they can chain down the fiends—fog, snow, frost, hail, and floods. These are the oddities of centuries; they affect the whole nation. A captain of a ship will not leave port, motor-coach drivers will not take the risk, aeroplanes remain in the hangars, but trains must be run.

May I be allowed to cite our side? In our district signals froze to the posts in a few seconds; ladders were so slippery that it was impossible to climb them, torches made of oily waste on wire being used to unthaw them; fog so dense you could not see the man next to you. Food, &c., for the staff was out of the question. I myself had none for about seven hours.

These conditions superimposed on the Christmas rush were, to put it mildly, very trying for the railway staff, and a kindly thought would be welcomed.

Yet, with it all, the staff carried on, and, even if we delivered a passenger safe and sound five hours late, we carried out the century-old rule—"The safety of the passenger is the first and last consideration at all times."

A. E. BUCKLEY (*Signalman*).
Dr. Days Bridge Jc. Signal Box, Bristol.
58, Raymond Road, Bedminster, Bristol, 3.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Tales of the '95

Coll-Earn, Auchterarder, Perthshire.
Christmas Day, MCMXXXV

To the Editor of The Railway Gazette

Sir,—Racing seems in the air—or at least on the tracks between Chicago, Ill., and the Twin Cities, where three railroads are putting up a bonniefecht and (as in 1888 and 1895 here) reaping the rewards of energy. So may I enliven the advent of 1936 by a few tales of the '95?

In one of the earlier runs Charles Rous-Marten, the famous train-timer, being in a hurry to get back to London for his work as Editor of the New Zealand Press (for though Dutch, and really a "Maarten," he went there as a boy), leapt out of the "racer" before it had stopped at Aberdeen and dashed across the platform to be hauled into the van of the south-going Flying Scotsman, which was on the move also. I heard the pawky Aberdeen guard, who saved him, calmly remark, "Ye'll no' be making a long stay in Aberdeen the morn." This non-stop north-south flight at Aberdeen was a startling sight as I never saw C. R.-M., either on or off an engine, dressed in anything but a high, full dress, funeral hat and a cut-away morning coat with a dog-collar and a flat, black tie, which get-up often made him to be taken for a cleric.

One night we raced towards our Aberdeen goal so well that when we stopped at Newcastle-on-Tyne a man put his head out and asked me, "Have we got to York yet?" So he had time to study the Newcastle night till a train from Edinburgh took him back, no doubt full of curses, to the archiepiscopal city. This station also gave another comic episode. A well known Edinburgh lawyer wrote a furious letter to *The Scotsman* damning all "Railway Races" because his hat had got to Edinburgh or Aberdeen without its head. He got out bareheaded on a hot night to dive for a drink. We changed engines in about three minutes, and so his hat moved on and was heading for the capital of this northern kingdom before he had well quenched.

On the last night of the "Railway Race" I did the feat of having four breakfasts in four divers places. (1) Soon after midnight one of my co-lunatics in our "sleeper" produced a flask and very massive sandwiches. (2) After Berwick-on-Tweed the attendant gave us coffee and biscuits. (3) Not long after 5 a.m. we were hammering the doors of the Imperial Hotel in Aberdeen calling for food. On getting in I said the Cockney pressmen must have real porridge for once, "and mind they have milk, all proper, and no beastly treacle or sugar." The poor waiter said, "There is no milk." I blazed into Highland fire, which he damped down by saying, "Man! the coos is no' milket yet." (4) I caught the Flying Scotsman portion from Aberdeen and landed in Edinburgh at 9.40 a.m., dashed to my near-by house to find the joyful remains of the family feed still on the table. I had done nearly 200 miles between my second and third breakfasts and about 130 between the third and fourth ones.

The last night of the "Race" was nearly the death of a group of famous and infamous folk, *i.e.*, the Rev. W. J. Scott, Sir William Acworth, C. Rous-Marten, Percy Caldecott, W. M. Gilbert (the chief-of-the-staff of *The Scotsman*), and myself. It fell on this-wise. My East Coast friends (N.E.R., N.B.R. and G.N.R.) always put on a "sleeper" for my party when any new spurt effort came to the birth. Till I got the N.E.R. to build the first transverse-berthed "sleeper" these were made up of cabins of two beds placed longitudinally, entered from a passage across the car.

At Portobello (Edinburgh) there then was a very bad S curve with our usual half-hearted British elevation, ending on a high bridge above a wide road.

At Inveresk Rous-Marten, with his four split watches (one in each hand and one in each trousers' pocket), called "82 m.p.h." I said, "If these two big Worsdell's don't slack off we will be thrown through the windows, even if we stay on the rails, at the Portobello S." I quickly got the six into the cross passage, where we jammed our legs and arms against the walls, myself at one window and Rous-Marten at the other. Just before the curves he called, "81½," and I yelled "Look out!" as we struck it. The whole of them were thrown on to me, and we collapsed, as does a Rugby maul, and in the next second we were hurled up again and on to the top of C. R.-M. In his dry Dutch way he was heard to say, "We would have made bonnie raspberry jam in that Duddingston road!" When we emerged into Waverley out of the Calton tunnel (after a mile of 1 in 78 up) we were doing about 64 m.p.h., and Acworth remarked, "Thank goodness we are working Westinghouse and not vacuum and that Waverley is very long."

Back from Aberdeen and fortified by my fourth breakfast I sought Mr. David Deuchars (Superintendent of the Line, N.B.R.) at Waverley, and said, "Look here, I like high-speed to save time and to develop traffic, but to reverse at Portobello at 81½ is a bit hot!" He pressed a button long and loud on his desk and his affrighted chief clerk came in with haste to be asked, "Mr. ———, what is the speed limit round Portobello?" "10 to 15 an hour I think, Sir." Deuchars looked at me with the gentle eyes of a reproving cow, and I felt like a schoolboy caught in his best lie. And so the episode ended.

The above W. M. Gilbert was the second case I know of of hair turning white from fright. Returning from "doing" the Paris Salon for *The Scotsman* he was in the East Coast night express, which at about 75 m.p.h. (luckily), and hauled by two N.B.R. engines, cut clean through a goods train on the outside avoiding tracks at Dunbar. Next day he had turned from dark to grey.

Yours seasonably,

NORMAN DORAN MACDONALD

The Fastest Train in Great Britain

Lavender Cottage, Armour Hill,
Tilehurst, Berks.

December 24, 1935

To the Editor of The Railway Gazette

Sir,—The G.W.R. Company's claim for its Cheltenham Flyer is that for a start-to-stop run between two stations it is the fastest train in Great Britain—*which it is.*

Mr. Cecil J. Allen's claim for the L.N.E.R. Silver Jubilee is that as it has a longer and more difficult journey to perform, with higher point to point averages, it is entitled to this honour although its start-to-stop speed is *less* than the Flyer's. Mr. Allen is trying to compare speed with performance, and while he might succeed with the aid of Euclid, the travelling and general public will still continue to regard an average speed of 71·3 m.p.h. as faster than that of 70·4 m.p.h. These are the average speeds of the Cheltenham Flyer and the Silver Jubilee start-to-stop *from their last stopping place to London* in each case.

When it comes to "tests" Mr. Allen reverses the procedure and compares performance of the Cheltenham Flyer under normal working conditions as an ordinary fare paying passenger train on presumably June 6, 1932, with speed reached on a special run of the Silver Jubilee made with only officials aboard. Mr. Allen was on both these runs, so should know the totally different conditions that prevailed better than anyone else.

But whatever may be argued, the Flyer's speed and the Jubilee's performance remain a credit to their respective railways.

Yours faithfully,

C. S. LOCK

THE SCRAP HEAP

A.—" Who's that important looking man over there? "

B.—" That's Sir William Mc.What's his name;—big railway director y'know."

A.—" Know him? "

B.—" Slightly: told me a month or two back he was standing in the Conservative interest at the election and now he's the sitting member for the division."

EARLY RAILWAY TRAVEL IN TURKESTAN

The train from Askabad which was to take me from Oozoon Ada to Samarkand came in between ten and eleven at night and started back again five or six hours behind time. I was told there was not a single first class carriage on the entire line. (Caspian-Samarkand.) At the end of the train there was one very high double-storied wagon, second-class below and third open trucks, 62 water cisterns on trucks, and 82 tank cars for petroleum. Many of the locomotives are always under repair in consequence of the sand getting into their wheels and machinery. As the Bokhara branch was not yet opened there were no through tickets for Samarkand, and passengers could only book as far as the Amu Darya. A Persian timetable and guide has also been published, with a fine portrait of the Shah, for the purpose of inducing the Shiite Mahommedans to avail themselves of the Russian railway in their pilgrimages to the holy city of Meshed.—*From "Russia's Railway Advance into Central Asia," by George Dobson.* (1890).

* * *

An unusual passenger service is provided by the railway which brings ball clay down from Corfe Castle to Goathorn, an isolated hamlet on the shores of Poole Harbour, in Dorset. Until 1934 ten children at Goathorn had to walk three miles to school, but the clay merchant which employs their fathers now provides transport daily in each direction by rail. We are indebted to Mr. S. P. W. Corbett for having specially taken the photograph of the " train " which we reproduce on this page. The engine is a 0-4-0 saddle-tank, *Thames*, built by Manning, Wardle & Co. in 1902 and numbered 48; the " passenger coach " appears to be one of the standard clay wagons on which has been erected a primitive wooden structure.

Nevertheless we do not doubt that the children regard this passenger accommodation as luxurious in comparison with their previous enforced pedestrian exercise. The interior of the "carriage" is fitted up with cushioned seats The train reaches Corfe at 8.50 in the morning, and returns at 4 in the afternoon, taking about 20 minutes in each direction, and costs the education authority 7s. 6d. per diem, which, if the distance and the number of children be correct, works out at 1½d. per head per mile.

A few buttons from railway uniforms of pre-grouping days

A reader has sent us the following forecast of railway speeds, which was published in 1833 in a magazine called *The Casket*:—

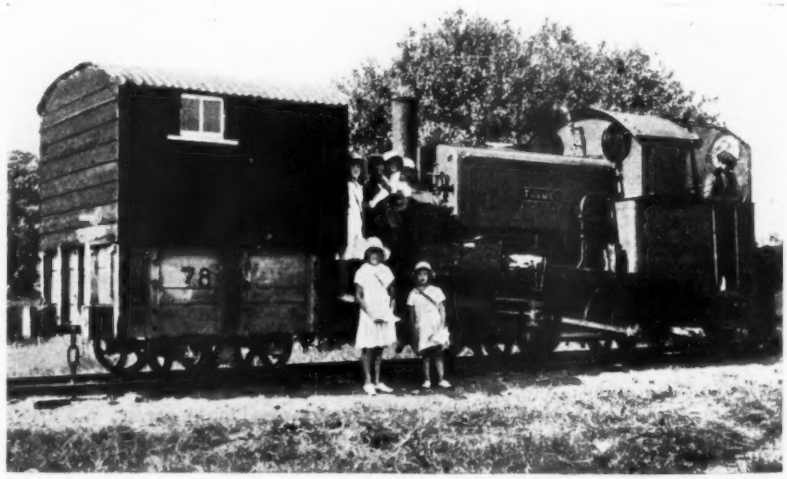
Extract from a Newspaper of 1933.

ANOTHER SHOCKING CATASTROPHE

As the warranted-safe locomotive smoke-consuming, fuel-providing steam carriage *Lightning* was this morning proceeding at its usual three-quarter speed of 127 miles an hour, at the junction of the Hannington and Slipby railroads, it unfortunately came in contact with the steam-carriage *Snail*, going about 105 miles per hour. Of course both vehicles with their passengers were instantaneously reduced to an impalpable powder. The friends of the deceased have the consolation of knowing that no blame can possibly attach to the intelligent proprietors of the *Lightning*, it having been clearly ascertained that those of the *Snail* started their carriage full two seconds before the time agreed on, in order to obviate, in some degree, the delay to which passengers were unavoidably subjected by the clumsy construction of their vehicle.

MELANCHOLY ACCIDENT

As a beautiful and accomplished young lady of the name of Jimps, a passenger in the *Swift-as-thought* locomotive, was endeavouring to catch a flying glimpse of the new Steam University, her breathing apparatus unfortunately slipped from her mouth, and she was a corpse in ¾ of a second. A young gentleman, who had been tenderly attached to her for several days, in the agony of his feelings, withdrew his air tube and called for help; he of course shared a similar fate. Too much praise cannot be given to the rest of the passengers, who with inimitable presence of mind, prudently held their breathing bladders to their mouths during the whole of this trying scene.



Photo] [S. P. W. Corbett

A school " train " in Dorset

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

The Transandine Railway Problem

The technical experts appointed by the Argentine Government to make an inspection of the damaged portion of the Transandine Railway and report on the prospects for its reconstruction, have completed their survey and are engaged in preparing their report. In an unofficial statement to the press, one of the engineers, Señor Farengo, pointed out that the nature of the terrain traversed by the railway—which involved numerous sharp curves, steep gradients, and the use of the Abt rack system over a considerable distance—made the question of rebuilding the line both difficult and complicated. To other constructional considerations had to be added those dealing with frequent interruption to the service during the winter months by snowfalls and avalanches. Other general considerations were that the heavy customs duties on cattle and other produce had seriously restricted traffic between Argentina and Chile, and, Engineer Farengo added, between 1926 and 1931, when the service was suspended for some months owing to the dispute over the cattle duties, two-thirds of the railway revenue was derived from passenger traffic, despite the fact that the passenger rates on the Transandine Railway were from five to six times higher than those on most of the railways operating in flat country.

Proposed Change of Route

Reverting to the technical aspects of the problem, Engineer Farengo stated that the points to which the committee were giving special attention were the rectification of constructional faults in the old route and the devising of means for the better protection of the line with a view to eliminating, as far as was humanly possible, a repetition of the disaster of January, 1934, and endeavouring to minimise the danger of damage by minor periodical avalanches and landslides. He expressed the opinion that if the service was to be re-established on a secure basis, a number of radical alterations would have to be made in the alignment. Of these the three most important were the following:—

(*a*) Between km. 49 and 55 the line should be transferred from the right to the left bank of the Mendoza river, thus avoiding the double crossing of the stream and eliminating two bridges, one 150 m. and the other 90 m. long. This would involve the removal of Potrerillos station to a new site about 1,700 m. from its present position.

(*b*) It would also be necessary to continue the line from km. 56 to km. 63 along the left bank of the same river, in order to avoid another double crossing.

These two alterations in the route would enable the track to be carried continuously along the left bank of the river from km. 39 to km. 125.

(*c*) The most important variation contemplated in the existing route is between km. 117 and 144, between which points it is proposed to remove Rio Blanco and Zanjon Amarillo stations, together with the inconvenience of reversing at the former, and the rack section between Zanjon Amarillo and Punta de Vacas stations.

The scheme, as tentatively outlined by Engineer Farengo, also provides for the construction of 8 bridges with a total length of 617 m., 11 tunnels with a total length of 1,366 m., and two additional snow sheds.

Although the rebuilding of the line presents formidable engineering difficulties, these are no greater than those on the original construction, and the realignment may even make the work of reconstruction easier. It is obvious, however, that the railway company itself is powerless to undertake this work without financial assistance from the State, and it would seem to be a good opportunity for the Argentine Government to divert some of the 40 million pesos, earmarked for the extension of the abortive Salta-Socompa line, to the reconstruction of the Transandine Railway, to be followed by a readjustment of tariffs, the unification of rolling stock and other measures tending to facilitate and simplify commercial interchange between Argentina and Chile.

Institute of Transport Centre

The annual general meeting of the above centre was held in Buenos Aires on November 12. The Chairman of the centre, Mr. J. G. Mayne (Percy Grant & Co. Ltd.) presided. The statement of accounts showed that the financial position was so satisfactory that, for the second successive year, the centre had been enabled to forego the donation of $2,400 paper granted to it by the British-owned railways in the country, to whose generosity in the past, the present sound position of the funds was largely due. The report on the year's activities showed that much useful and interesting work had been done. The Chairman thanked the committee for the valuable assistance they had given him during his term of office, and proposed that a special vote of thanks be accorded to the Honorary Secretary (Mr. F. C. Egerton) and the Honorary Treasurer (Mr. J. A. Meelboom) for their services. He also expressed the thanks of the centre to the authorities of the Chilean State Railways for their invitation to visit the neighbouring republic in October last, [described in our issue of December 20—Ed., *R.G.*] and their warm appreciation of the trouble they had taken to make the trip so thoroughly enjoyable; as also to Mr. M. F. Ryan, C.B.E. (General Manager, B.A. & Pacific Railway) for the travelling facilities granted over that company's line in connection with the trip. On behalf of the party who visited Chile, Mr. Mayne was presented with a handsome silver salver as a mark of their appreciation of the very efficient arrangements he had made for the journey as well as during their stay in Chile. The following were elected members of the committee for 1936:—Messrs. H. G. Beckwith, G. C. Bonner, F. A. Bottomley, F. C. Egerton, J. Harding, C. R. S. Harris, L. W. Makin, K. Marshall, A. S. Matthews, J. G. Mayne, J. A. Meelboom and A. T. L. Pride.

UNITED STATES

A Prosperous October

Net railway operating income—namely income after tax deductions, but before the inclusion of earnings from investments, and before the payment of interest on bonds—of the American railways in October totalled approximately £15,000,000, an increase of 53 per cent. over the same month in 1934. This great improvement was effected with an increase in gross receipts of less than 17 per cent., a fact that indicates how quickly the financial position of the American railways will improve if general economic recovery persists.

Improvement May Save Several Railways

To be sure, October is normally the best month in the year for traffic and earnings, and a seasonal decline always sets in in November and becomes very deep in December. But, eliminating seasonal variations by comparing this year's traffics, week by week, with those of last year, it is seen that gross receipts are continuing to average about 15 per cent. higher. Recalling that the effect of greater gross revenues is greatly magnified in net, it is evident that the favourable traffic developments of the past three months, if continued, will remove several railways from the danger zone.

As a matter of fact, the net operating income earned in October was sufficient to make the total for the 10 months 1 per cent. greater than for the same period of 1934, whereas at the end of September net railway operating income was more than 6 per cent. under that of the first three-quarters of 1934.

Strike Vote on the Burlington

Members of the locomotive firemen's union on the Chicago, Burlington & Quincy have voted, by a substantial majority, in favour of a strike to compel that railway to employ a "fireman" or helper in the cab of its Zephyr diesel-electric high-speed trains and diesel-electric shunting engines. The vote is not final, however, and negotiations are still in progress. The union bases its contention for the employment of supernumeraries on safety, but the railway points out that 1,500,000 miles have been operated by the Zephyr trains and 30,000 hours have been worked by the shunting engines without injury to any-

one. One of the features of the Zephyrs is the dead man's control whereby the train is brought to an immediate stop if the driver's grip on the control lever is relaxed.

Actual Number of Jobs Increased

The dispute is a fundamental one. If the union wins, the result will be a definite curtailment in the prospects for wide use of such trains to give more frequent service and hence win back passenger traffic. The railway contends that the union, by a rule requiring employment of supernumeraries, will injure rather than aid its members. The railway shows that the operation of the Zephyrs has created 42 jobs—10 enginemen, 8 conductors, 8 trainmen and 16 dining car employees. Seven firemen's positions, it is true, have been sacrificed by the removal of the steam trains which the Zephyrs have replaced, but these positions have been more than offset by the 10 firemen promoted to enginemen—a net gain of three jobs for firemen alone.

KENYA & UGANDA

New Rolling Stock

A programme has now been prepared for the replacement of worn-out stock over a period of three years 1935-36 to 1937-38. In the current year 12 bogie coaching units and 36 four-wheel vans, horse-boxes, &c., will be ordered and 8 bogie caboose coaches are being built locally. In 1936-37 6 bogie and 11 four-wheelers will be added: in 1937-38 only four bogies will be built but 25 vans are included in the programme.

All-welded Coaching Stock

In this connection the following extracts published in the General Manager's Bulletin, No. 16, are of considerable interest:—

As far as Nairobi workshops are concerned, the African native has been taught to weld very successfully during the last two or three years. It has obviously been necessary to take out of his hands the responsibility of setting up the work and choosing the particular class of electrode, welding as far as he is concerned being confined purely to manual skill under careful supervision. We are thus fortunately placed in having a good class of labour for this work at a low cost.

Underframe and Body Unit Construction

A few months ago, permission was given and the preliminary work put in hand for the construction of eight short bogie coaches for "caboose" work. After careful consideration it was decided that these should consist of a steel underframe and body frame of unit construction, completely welded. The underframe, body, side and end frames, for which only standard rolled-steel sections are being used, will each be handled separately, being welded in fixtures and subsequently assembled. The preparation of the various fixtures is now actively in hand. Apart from the advantages of welding, the unit form of construction gives the maximum rigidity with the minimum weight, a very important point in a case such as this, where the vehicle is not a revenue earner.

The exterior of the coach will consist of mild steel panelling riveted to the steel body members by snap-headed rivets. The interior lining of the vehicle is being carried out in Sundeala hardboard, the necessary framework and mouldings being made from *mvuli* (African teak). For the purpose of securing the lining, wooden packings are being affixed to the steel members, though the weight of these and all the woodwork is being kept down to the very minimum. Each living compartment, of which there are four, is being provided with electric fans, and the lavatory compartments, to the number of three, are being fitted with shower baths. The floor of the entire vehicle is being laid on key-sheeting and will consist of a composition which, in the case of the lavatories, will be swept up the walls as far as the cornice.

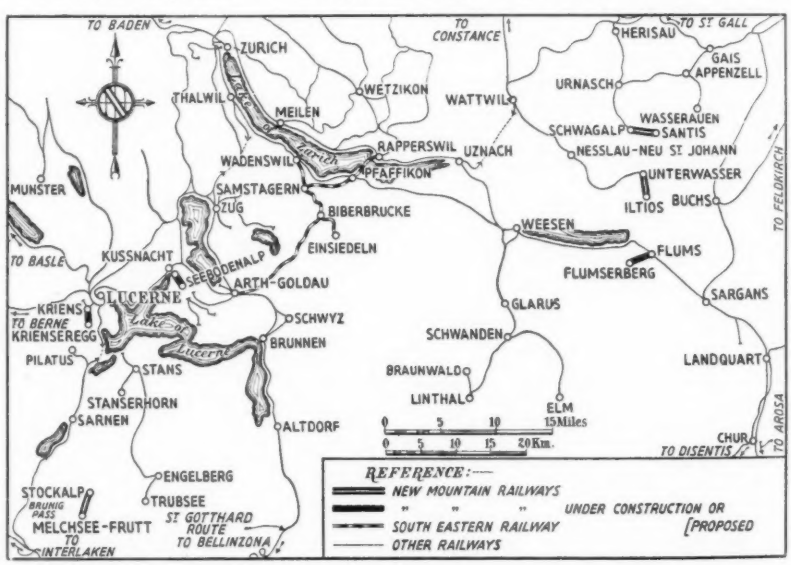
Insulation but No Steel Pressings

Insulation and sound deadening will be effected by spraying asbestos fibre and an adhesive on to the inner side of the steel shell plates to a depth of ½ in., prior to the interior lining being fixed. Though not the first all-welded coaching stock to be produced, these cabooses will have some novel features, inasmuch as all the steel components are either standard sections or plates and not a single pressing is used. Furthermore, the whole fabrication will, as far as is possible, be carried out by native labour, whose only item of clothing a few years ago consisted of a blanket.

SWITZERLAND

New Mountain Railways

An aerial cable railway 3½ km. in length, from Stöckalp, at the end of a mountain road from Sarnen, to Melchsee-Frutt (6,300 ft.), was opened on December 23 in time for the winter sports season. Work on the construction of this new line was begun last April. A similar line has been authorised from Küssnacht, on the lake of Lucerne, to the resort of Seebodenalp (about 3,000 ft.), on the western slope of the Rigi. Other projects are for ordinary funicular railways from Flums, on the Zurich-Sargans-Chur main line of the Swiss Federal Railways, to the heights of Flumserberg, and from Kriens, near Lucerne, to Krienseregg, on the first slopes of Pilatus; in the latter case there is an alternative proposal for an aerial cable railway. Both these schemes rely on the considerable summer excursion and winter sports traffic which may be expected, as the heights above Flums and Kriens attract great numbers of hikers and skiers. For the Flumserberg line it is also anticipated that there will be an appreciable local traffic. The most recently opened mountain lines are the Säntis aerial railway (August 1, 1935), and the funicular line from the resort of Unterwasser to Iltios (1934), both in north-eastern Switzerland.



Sketch map showing new and proposed Swiss mountain railways, and also the South Eastern Railway for which electrification is contemplated

The South-Eastern Railway

The electrification of this small standard-gauge system is contemplated. At present the coaching-stock is antiquated, and for any but very light trains it is necessary to use two or even three steam locomotives, in view of the long continuous grades at 1 in 20. Only two of the engines are of comparatively recent construction, nine were built between 1880 and 1891, and two are still older. On public holidays all thirteen engines are in service, and occasionally others have to be borrowed from the Federal Railways. There is a considerable traffic to Einsiedeln at certain times, and on such occasions the splitting up of long trains—in connection with specials from France, Germany and elsewhere—is unavoidable and causes much delay. It is expected that with three electric locomotives and five electric railcars the whole traffic can be worked expeditiously and a speed of 40 km.p.h. be attained on the steepest gradients with a 150-tonne train behind the engine, or 50 tonnes for the railcars. As the trains use the Federal Railways' stations at the three terminal points and at Pfäffikon, only the standard 15,000-volt single-phase system generally used in Switzerland can be considered.

The South-Eastern Railway (Südostbahn) consists of a main line from Arth-Goldau, on the St. Gothard route, to Pfäffikon, and across the lake

Zurich on a causeway to Rapperswil, with branches from Biberbrücke up to Einsiedeln and from Samstagern down to Wädenswil. The original line is that from Wädenswil to Einsiedeln, which was opened in 1877. The Arth-Goldau-Rapperswil line forms a short route, in connection with the Bodensee-Toggenburg system, from the Gothard route to St. Gall and the lake of Constance.

Rail-Road Co-ordination

At a meeting of the Administrative Board of the Swiss Federal Railways on November 27, the report of a committee regarding road feeder services for goods collection and delivery was approved. This provides that further examination will be made into the results achieved on the routes along which such services have already been introduced—the first of these was between Zurich and Romanshorn in 1932—before any general decision is taken on the subject. Investigations are also to be made with a view to securing closer co-operation between the Federal Railways and the Post Office in connection with parcels traffic. Experiments are at present being carried out on the Berne-Lucerne and Zurich-Affoltern lines.

INDIA

Railways and Commerce

It is understood that several resolutions pertaining to railways will be moved at the annual meeting of the Associated Chambers of Commerce to be shortly held at Calcutta. The creation of a Department of Communications in the Government of India is likely to be discussed, and the subject of railroad competition is expected to be dealt with in a resolution.

Railway Fares Enhanced

From December 1, first and second class fares on the South Indian Railway have been substantially raised. First class passengers have now to pay at a uniform rate of 21 pies (1¾d.) a mile in place of 15 pies (1¼d.) a mile by ordinary, and 18 pies (1½d.) by mail train. For second class passengers the rate was 9 pies (¾d.) a mile by ordinary train and 12 pies (1d.) a mile by mail. Now a uniform rate of 12 pies (1d.) a mile has been introduced. The effect of these alterations in fares will be watched with interest, as some railway critics have long suggested that the expenditure on upper class carriages on Indian railways generally is incommensurate with the earnings derived from upper class passenger traffic.

Competition between Railways and Shipping

As foreshadowed in these columns, the Government of India is convening a conference at Delhi on December 20 to discuss the question of competition between the railways and the shipping companies for port-to-port traffic. It is understood that the conference will also help to lay down the principle which should regulate the commercial interests of railways and the shipping companies, and one which will also affect the finances of the various ports. The Governments of Bengal and Bombay, the Associated Chambers of Commerce and the Federation of Indian Chambers of Commerce have been asked to send representatives to the conference. Sir Zafrulla Khan, Member for Railways and Commerce, it is expected, will preside.

Passengers Without Tickets

During the year 1934-35, no fewer than 159,978 persons were detected travelling without tickets on the South Indian Railway, and a sum of Rs. 1,41,000 was realised from the delinquents. Vigilance on the part of the railway staff also enabled the detection of about 24,600 cases in which luggage was improperly booked, and the offenders were made to pay a sum of approximately Rs. 40,000.

Christmas Concessions

In addition to the usual cheap return Christmas holiday fares charged by all railways, the Eastern Bengal Railway will issue intermediate and third class travel-as-you-like season tickets available from December 20, 1935, to January 5, 1936, at the following rates:—

	Inter Class Rs.	Third Class Rs.
Broad gauge	15	10
Metre gauge	15	10
Broad and metre gauges combined ...	22·8	15

Holders of these tickets may travel and break journey as often as they desire. This privilege is not new in India, as the Madras & Southern Mahratta Railway issued "unrestricted zone tickets" during the Christmas season last year, with notable success. Encouraged by the result, the same railway introduced the travel-as-you-like ticket during the Easter holidays, a concession available to all classes and not confined to any section or zone. The South Indian Railway, too, introduced a zone ticket recently, and will also offer the travel-as-you-like concession during the Christmas holidays.

EGYPT

Agricultural and Industrial Exhibition

The Railways, Telegraphs & Telephones Departments are to have a combined stand at the Gezireh (Cairo) forthcoming Agricultural and Industrial Exhibition, to be held in February next. It is understood that several models now in the Egyptian State Railways, Telegraphs & Telephones Museum will be exhibited, and the Publicity Section will have a display of posters including some directed to assist the "Call of Egypt and its Monuments," the latter all being reached by rail in comfort. The Telegraphs and Telephones Departments are to exhibit an automatic exchange actually at work and various innovations in the development of telephones.

Fuel Economy

As coal consumption has been rising during the last few years, a Fuel Economy Section has recently been formed to investigate the causes of the increase and if possible reduce consumption. Mr. J. C. Strahan, B.Sc., has been appointed to take charge of the Section, assisted by Abdou Effendi El-Nahas and three inspectors. The section is at present concentrating its efforts upon the Cairo Division, but if successful there, its activities will be extended to all divisions. A 10 per cent. reduction in coal consumed would represent a saving of £E.41,500 a year, or about 1 kg. per engine-kilometre, and it is at this saving that the section is aiming.

Cairo-Suez Railcar Service

On October 11 a passenger service between Cairo and Suez, 79½ miles, via the new direct line [described and illustrated in THE RAILWAY GAZETTE of October 11 last—ED., *R.G.*] was inaugurated with the new Ganz dieselmechanical railcars [fully described and illustrated in our *Diesel Railway Traction Supplement* dated September 6, last.—ED., *R.G.*], with first and second class accommodation. There are two services each way daily, taking from 2 hr. to 2 hr. 9 min., as against the former fastest time by the old indirect route of 4 hr. 50 min.

Cairo-Helwan Local Diesel Service

The ordinary train service between Cairo and Helwan-les-Bains, 15½ miles, has, since December 1, been supplemented by a diesel railcar service. The car used originally carried first and second class passengers but, owing to its popularity and to third class passengers paying the difference to ride in the second class accommodation, it now carries only first class passengers. The time taken is 28 min. including three intermediate stops.

JUGOSLAVIA

Proposed New Lines

The Minister of Communications has announced that the Government's new programme of public works includes *inter alia* the early commencement of work on new railway lines between Bihác and Knin and Ustipraca and Foca. The Minister pointed out the importance of these lines from the economic and tourist point of view, especially the Bihác-Knin line which will form the shortest route from Belgrade, Zagreb, and Bosnia to the sea.

Railcars

During 1936, the Minister said, railcars would be put into service on the Belgrade-Sarajevo-Dubrovnik (Ragusa) line, which would shorten the journey and render it more agreeable.

BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for Sept., 1935, as compared with Sept., 1934, compiled from the Ministry of Transport Statement No. 190

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	103,324,124	8,162,881	15,760,737	25,339,389	18,300,029
Increase (+) or decrease(—)	+ 2,746,950	+ 27,607	+ 91,027	+ 353,551	— 19,305
Passenger receipts (excluding season ticket holders)	£4,705,432	£634,468	£967,327	£1,528,912	£1,028,707
Increase (+) or decrease (—)	— £67,671	— £16,931	— £22,679	— £29,718	— £19,500
Season ticket receipts	£1,012,460	£73,920	£180,284	£263,339	£326,471
Increase (+) or decrease (—)	+ £78,083	+ £5,519	+ £7,255	+ £11,060	+ £35,479
Parcels and misc. traffic receipts (excluding parcels post)	£1,043,081	£192,466	£306,704	£395,589	£128,493
Increase (+) or decrease (—)	— £4,721	— £1,805	+ £5,815	— £3,697	— £4,984
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	20,941,815	4,818,963	9,421,815	9,798,336	1,263,859
Increase (+) or decrease (—)	— 461,711	— 450,567	— 401,334	+ 224,135	— 32,822
Net ton-miles (excluding free-hauled)	1,195,346,336	219,135,398	393,942,539	495,475,491	53,369,288
Increase (+) or decrease (—)	— 10,085,056	— 12,574,051	— 12,942,334	+ 16,132,076	— 850,961
Average length of haul (miles) (excluding free-hauled)	57·08	45·47	41·81	50·57	42·23
Increase (+) or decrease (—)	+ 0·76	+ 1·50	+ 0·39	+ 0·50	+ 0·42
Freight traffic receipts	£6,697,085	£1,156,000	£2,140,000	£2,810,000	£382,515
Increase (+) or decrease (—)	— £65,334	— £13,000	— £118,000	+ £74,000	— £9,236
Receipts per ton-mile	1·345d.	1·27d.	1·30d.	1·36d.	1·72d.
Increase (+) or decrease (—)	— 0·001d.	+ 0·06d.	— 0·03d.	— 0·01d.	— 0·01d.
Freight train-loads: Average train-load (tons)	124·47	130·11	128·37	123·69	101·08
Increase (+) or decrease (—)	— 0·83	— 6·48	— 2·58	+ 2·65	+ 0·08
Net ton-miles—					
Per train engine-hour	1,003·64	1,049·43	1,039·64	994·37	794·32
Increase (+) or decrease (—)	— 3·97	— 38·77	— 10·23	+ 19·23	— 20·64
Per shunting-hour	859·74	770·11	917·01	922·10	561·73
Per total engine-hour	463·07	444·17	487·24	478·44	329·04
Net ton-miles per route-mile per working day	2,613	2,560	2,743	3,136	1,137
Increase (+) or decrease (—)	— 25	— 147	— 95	+ 95	— 7
Wagon-miles. Total	355,795,544	63,479,325	121,389,991	150,937,203	17,817,036
Increase (+) or decrease (—)	+ 1,635,599	— 1,071,525	— 1,512,365	+ 4,296,941	— 41,090
Percentage of loaded to total	67·00	69·30	64·31	68·28	66·70
Wagons per train— Total	34·90	35·06	35·26	35·14	31·68
Increase (+) or decrease (—)	+ 0·28	— 0·28	+ 0·06	+ 0·69	+ 0·23
Loaded	23·38	24·30	22·67	23·99	21·13
Empty	11·52	10·76	12·59	11·15	10·55
Train-miles. Coaching— Per train-hour	15·30	14·26	14·47	14·75	17·77
Per engine-hour	12·16	11·32	11·17	11·17	14·32
Train-miles. Freight—Per train-hour	9·46	9·76	9·49	9·27	9·63
Per engine-hour	3·72	3·43	3·84	3·87	3·21
Engine miles. Total	47,472,093	7,473,751	12,961,467	17,703,388	6,409,435
Increase (+) or decrease (—)	+ 423,366	+ 93,464	+ 62,483	+ 123,568	+ 127,549
Mileage run by engines. Total train-miles—					
Coaching	24,447,432	3,365,872	5,585,013	8,076,440	4,730,273
Freight	10,193,364	1,810,534	3,442,271	4,295,836	562,371
Engine-hours in traffic. Total	4,945,415	848,272	1,465,204	1,913,720	519,314
Increase (+) or decrease (—)	+ 120	— 713	— 8,156	+ 8,954	+ 384
Shunting miles per 100 train-miles—					
Coaching	7·35	6·77	6·57	7·94	8·17
Freight	72·31	84·40	68·78	66·37	94·77

Passenger Traffic Statistics: Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—September, 1935

Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	30,171,130	790,459	1,213,126	1,591,142	2,874,124	21,798	145,410	22,628,009	77,436
Gross receipts	£1,015,972	£104,260	£160,719	£170,350	£245,248	£3,487	£1,508	£311,718	£1,393
Receipts per pass.	8·08d.	31·66d.	31·80d.	25·69d.	20·48d.	38·39d.	2·49d.	3·36d.	4·32d.
Reduced fares—									
Excursion and week-end—									
Pass. journeys	43,621,067	5,039,999	10,039,417	15,869,892	9,142,723	445,850	116,316	1,270,068	595,372
Gross receipts	£2,938,939	£444,382	£658,677	£1,117,324	£609,117	£28,461	£1,255	£29,621	£9,057
Receipts per pass. journey	16·17d.	21·16d.	15·75d.	16·90d.	15·99d.	15·32d.	2·59d.	5·60d.	3·65d.
Workmen—									
Pass. journeys	25,058,881	1,786,798	3,330,015	6,620,637	5,375,534	235,362	196,310	6,459,318	183,404
Gross receipts	£366,994	£26,534	£54,509	£106,680	£89,301	£4,082	£1,598	£71,971	£1,686
Receipts per pass. journey	3·51d.	3·56d.	3·93d.	3·87d.	3·99d.	4·16d.	1·95d.	2·67d.	2·21d.
Other									
Pass. journeys	4,439,564	537,699	1,169,544	1,243,514	905,219	65,559	37,109	388,829	11,888
Gross receipts	£348,848	£50,316	£86,489	£118,506	£82,637	£3,946	£239	£3,415	£202
Receipts per pass. journey	18·86d.	22·46d.	17·75d.	22·87d.	21·91d.	14·45d.	1·55d.	2·11d.	4·08d.
Total									
Pass. journeys	103,324,124	8,162,881	15,760,737	25,339,389	18,300,029	768,737	495,145	30,746,224	868,100
Gross receipts	£4,705,432	£634,468	£967,327	£1,528,912	£1,028,707	£40,151	£4,600	£416,725	£12,338
Receipts per pass.	10·93d.	18·65d.	14·73d.	14·48d.	13·49d.	12·54d.	2·23d.	3·25d.	3·41d.

* All standard gauge railways. † Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

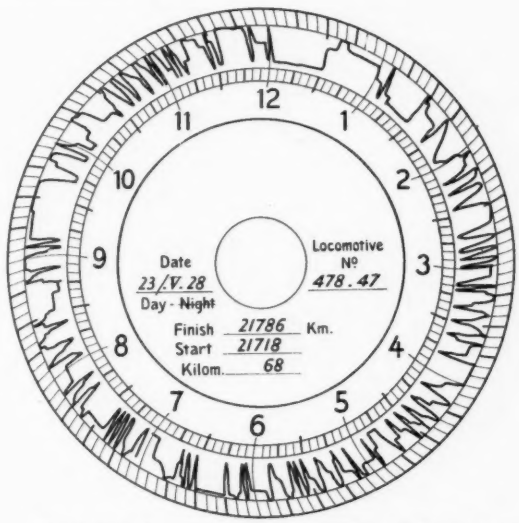
RECORDING THE WORK PERFORMED BY SHUNTING LOCOMOTIVES

An instrument known as the Chronhodograph is being used with considerable success for this purpose in Austria

By C. CZEIGER, Engineer, Vienna

THE work performed by shunting locomotives constitutes an item in railway expenditure which is not only considerable but also very difficult to check accurately by ordinary means. This work is normally accounted for in shunting hours, the returns being based merely on the estimates of the employees engaged. In terms of distance covered the work done is ascertained indirectly and by rule of thumb, varying between 3 and 8 miles per shunting hour, according to the practice and working conditions adopted by the different railway companies. The difference between these two limits shows up very clearly the doubtful value of this method of ascertaining the work done, and it is impossible to effect economies in the expenditure of labour and material accounts involved in shunting work because accurate figures on which to base the calculations are lacking.

With these considerations in mind, the Administration of the Austrian Federal Railways, after prolonged experimental investigation, adopted the instrument known as the Chronhodograph, with a view to effecting more accurate control of shunting operations and ascertaining their cost, and the success achieved by the use of the instrument has exceeded all expectations. In spite of the fact that the work to be performed by a shunting engine depends on local requirements, the layout of the sidings, weather and visibility, and other factors, the records furnished by the new instrument provide sufficiently accurate and detailed information for the work to be carried out more economically. Whereas hitherto any increase in the total weight of the wagons shunted has been accompanied by an increase in the number of shunting hours, and therefore in the number of shunting engines required, and the total expenditure of labour and material, it has, since the introduction of the new checking method in 1926, been found possible to reduce the total number of shunting hours in spite of increasing gross ton-mileage, and thereby to achieve a very considerable saving in the number of shunting engines and the expenditure attendant thereupon. In one test period the work done was 400 million gross ton-miles higher than in the preceding period, whilst the shunting hours were reduced by 5,780, and it has been found possible since to improve very considerably on this result.



Typical stylo record from the Chronhodograph

External view of time - distance indicator used on the Austrian Federal Railways

As its name indicates, the Chronhodograph is a time-distance indicator. Upon circular discs rotated by clockwork, a stylo records continuously all periods of movement as jagged lines, and all standstill periods as arcs. These check discs were originally designed for a twenty-four hours record, but experience showed that twelve-hour discs were preferable on account of their greater clarity. Each engine driver has his own disc for the time he is on duty, receiving it at the commencement of a shift and giving it up at the end of the shift as proof of the work done.

As can be seen from the illustration, the instrument at the same time registers the total number of miles covered, this figure being entered on a check disc. In this manner the mileage per shift is also recorded, while the total amount of work done by the engine can always be read off at the instrument. The proper times for overhaul are deduced from the total mileage covered by the engine.

The instrument is so designed that any tampering, wrong treatment, or mechanical faults are at once revealed. The only manipulation required, apart from the insertion of the discs, is the winding up of the clockwork every twenty-

four hours. The instrument is fixed on one side of the cab in such a manner that the discs can be easily inserted; it need not be watched during working, and therefore need not be placed so that it can be seen.

The drive for the recording and counting mechanism takes its motion from one of the axles, and it is immaterial whether the movement of the engine be forward or backward. Reverse gearing in the instrument ensures that movement in either direction is recorded continuously, unless it is specially desired to record forward and backward movement separately. The circumference of the wheel from the axle of which the drive is taken must correspond with the driving gearwheel of the instrument, but the latter is readily changeable to suit the circumstances. If the locomotive is already equipped with a speed indicator, a branch from the same drive can be taken to the Chronhodograph. In view of the springing, flexible driving shafts were originally used in Austria, but had the disadvantage of being easily broken. It is therefore preferable to use rod transmission with bevel gears at the angles, mounted above the springs and resiliently connected with the driving wheels to allow for action of the springs. Transmissions of this type, with slotted driving cranks, have proved satisfactory in every respect.

BUILDING AND EQUIPPING RAILWAY EXTENSIONS IN CHINA

Necessity for low construction costs — Imported sleepers, wood or steel—Types of locomotives required

(By a correspondent recently returned from China)

THE Republic of China is one of the few countries in which any considerable amount of railway construction is being undertaken,* and this fact, of which THE RAILWAY GAZETTE is constantly producing evidence, is naturally one of importance to manufacturers of railway material and equipment. As is well known, few of the railway administrations in China have much money to spare on luxuries, and where new railways are being constructed independently of existing ones, funds are not so plentiful as to permit of other than bare necessities being purchased. As in other walks of life the " coat must be cut according to the cloth " and the Chinese authorities have to solve the problem as to whether a railway is to be a " Saville Row Waistcoat " or a " Fifty-Shilling Tailor Jacket." The indications are that they have decided to eschew luxury and concentrate on obtaining a fair outer garment which may in the future be renewed into the first class article, and in this they show sound political and business instincts.

It must not be overlooked that railway mileage in China is small in comparison with the area and population of the country, and further, that south of the Yang Tze Kiang it has not until recently exceeded 1,000 miles. The great need therefore is to get as great a railway mileage as funds permit, and that as quickly as possible, so that the country can be developed on modern lines, the authority of the Central Government strengthened, and the effects of world depression in foreign trade and currency troubles offset by the development of internal commerce, so that a modern nation may emerge.

China is a country where the whole history of transport can be exemplified in a few hours, from coolie to luxury air liners. Predominating, however, are the primitive means, the coolie, wheelbarrow, the sampan and the junk: the basis of Chinese transport is still the river and the old and narrow pack-animal track. The average speed of transport is therefore low, and anything that offers an advance on this speed at a competitive figure is a great step forward. Owing to the prevalence of waterways, however, costs must as a rule be kept very low if a financial return is to be obtained and traffic encouraged to develop.

The problem is not easily solved where available moneys have to be expended so cautiously. Untreated wood sleepers, for example, do not last long in the climatic conditions prevailing, and there is not an efficient creosoting plant in China, nor would the present mileage justify more than one good plant, for the majority of the sleepers have to be imported. Soft woods and medium quality hardwoods are at present being used, the latter in white-ant infected districts, together with a proportion of treated imported sleepers, impregnated prior to delivery. There is no doubt that steel sleepers would be economical, and that if the difficulty of greater first cost could be surmounted, many more would be seen in the track.

The rails on many of the existing lines are ageing and will in many areas soon reach tolerance limits, but new rails are expensive, and for a good deal of the new construction work, especially that undertaken by provincial governments and private companies, second-hand rails are being imported. These are often of odd lengths, and no doubt some of these light railways when they begin to show a return on their capital, will be thinking of purchasing new rails, and also of welding a proportion of rail joints. A certain amount of second-hand rolling stock is also being utilised, but as the National Railways improve their own stock position, a fair amount of second-hand material will become available for transfer to the new light lines. Plans are in existence for bringing the track up to a condition to carry 20-ton axle loads, and this will involve a good deal of bridge strengthening by welding and other means, as well as entire reconstruction in numerous cases. Sole plates on the sleepers will also be required.

Meanwhile there is a field for the Garratt type of locomotive, with its possibilities of very light axle-loading and flexibility of wheel base, features obtained without sacrifice of power. Hitherto conventional types of locomotive have been adhered to except on a small section of the Peiping-Suiyuan line, where several Mallett type engines are in use. In the hilly districts of the west, and in the areas in the south-east, where much new construction is being undertaken, there is also a natural field for the Garratt. As the network progresses and lines not now connected are linked up, and as the commercial prospects of new through services improve, the necessity of additional coaching and goods stock will become progressively more apparent. Signalling systems are simple and it will probably be some time before any necessity to elaborate them arises, but it is understood that the question of wider telephonic facilities is being considered. Of the railway behind the scenes, naturally the most important parts are the facilities for maintenance and repairs, and here much remains to be done. The equipment and modernisation of repair shops is a great problem that will have to be tackled in connection with both the existing system and the lines under construction.

* See article, pp. 6 and 7 in THE RAILWAY GAZETTE Special Overseas Railways Number, of November 27, 1935, and also annual résumés of the progress of construction work in China with maps, published in our issues of October 12, 1934, and November 1, 1935.

PIONEER WORK IN RAILWAY SAFETY*

II—Lock-and-Block

ALTHOUGH it is safe to claim that the block system is one of the most important factors in the safety of railway travel, its original use was so bound up with the introduction of the electric telegraph on railways that it is difficult to select any particular feature as being actual pioneer work. It must, therefore, suffice to recall that the first instrument to record the acceptance, dispatch and clearance of trains by means of an indicator, electrically actuated by the signalman at the box in advance, was introduced by Edwin Clark on the London & North Western Railway in 1853. In the supplementary use of lock-and-block there was, however, distinct pioneer work, and that is the subject of the present article.

No brief description of what lock-and-block consists of, and what is its purpose, appears to be available. The late Mr. F. Hollins, then telegraph superintendent of the Great Eastern Railway, in his paper " Electrically Interlocking the Block and Mechanical Signals on Railways," read at the Institution of Electrical Engineers on January 28, 1897, gave what is probably the best interpretation of the term. It read: " The term ' electric interlocking '—that is interlocking the outdoor signals with the indoor block signals—is generally applied to a combination of electrical and mechanical apparatus which compels the signalman to work his outdoor signals absolutely in accordance with his electrical block signals—both of which are electrically under the control of the signalman at the box in advance—and, with the most complete systems, so controlling, by means of a rail contact, the signalman at the box in advance, that neither the block apparatus nor the outdoor signals at the rear box can be operated to admit a following train until the preceding train is absolutely clear of the section."

In passing, it may be observed that if, as Mr. Hollins claimed, the most complete systems of lock-and-block include a rail contact, it is necessary again to mention the name of Mr. Edward Tyer, who, as related in our article of February 1, invented the rail contact, which he protected by patent 13906 of January 22, 1852, and therein described as " a treadle to be depressed by the flanges of the wheels which, giving motion to a crank shaft and crank, causes a spring to come in contact with certain metal strips and so completes the circuit."

In 1870 a patent—No. 1268—was taken out in which " The lever used for working the semaphore or other signal at one station is locked and prevented from being put in action until released by the signalman at a distant station." It was in the names of William Henry Preece and William Langdon. The former was then Telegraph Superintendent of the London & South Western Railway and the latter was his assistant. After the State took over the telegraphs in 1870, both went to the Post Office, where the former became the Chief Engineer and, later, Sir William Preece. Mr. Langdon, in 1878, went from the Post Office to become the Telegraph Superintendent of the Midland Railway and, incidentally, to develop a lock-and-block system, which he protected by patent No. 677 of 1882.

In 1872 Mr. W. R. Sykes put in an installation of automatic signalling on the westbound line at Victoria station, Metropolitan District Railway. The patent specification was No. 3448 of that year and it calls for reference now because (1) of the design of the treadle, therein protected, which caused a red light to be automatically displayed on the passage of a train, and to be changed to white when the train passed over a second treadle, placed a suitable distance in advance of the first; and (2) the automatic recording, on a paper strip driven by clockwork, of the times trains passed, electric signals were given, and similar information.

This was a noteworthy proposal, but its principles should not be confused with the general question of the interlocking of the outdoor signals with the block instruments. To quote the specification, additionally to recording the times of arrival and departure of trains: " this electric registering apparatus may be advantageously adapted to other registering purposes; for example, for checking the working of ordinary block signalling instruments so that the true time of the arrival or departure of a train may be ascertained should any dispute arise between two stations."

Sykes did not, however, proceed with the idea, as he was advised that it would be too expensive. Collisions due to irregular block working are now comparatively rare, but in the year 1910 the Board of Trade Inspecting Officers reported on two such collisions, on five in 1911 and four in 1912. In his report on the serious collision of December 5, 1910, at Willesden, Sir Arthur Yorke said " I have long been of opinion that it would be a great advantage, at places where the signalmen are too busy to do the train-booking themselves, to adopt an automatic recording device, working in connection with the block instrument, so that every block signal given and received would be recorded upon a tape. In these days of electrical and mechanical science, there should be no difficulty in designing such an instrument. The accuracy of the records and the check upon irregularities which would thereby be afforded would, I believe, more than compensate a railway company for the cost of the machine." In the following June Sir Arthur repeated this recommendation in connection with a buffer stop collision at Henley-in-Arden, and in July of the same year in his report on a collision at Crewe. As it is now 25 years since this advice was given and, as it was not accepted nor has since been repeated, it would seem that Mr. Sykes was wise in not proceeding with his idea.

Mention must now be made of another inventor of interlocking the outdoor signals with the indoor block signals, combined with the use of rail contacts—Mr. C. E. Spagnoletti, at one time the Telegraph Superintendent of the Great Western Railway and of the Metropolitan Railway. His patent was No. 2401 of 1873. After that came Mr. Charles Hodgson, of Saxby and Farmer, with patent No. 4179 of 1879 and then, in 1882, Mr. Langdon.

The most widely used of these systems, and the one which may be described as demonstrating the survival of the fittest, is that which Mr. Sykes developed from his patent of 1872, retaining the treadle principle. In 1874 Sykes saw J. Staats Forbes of the London, Chatham & Dover with a plan for equipping the boxes at Shepherd's Lane, Brixton and Canterbury Junction. That was approved and carried out and led to patent No. 662 of 1875, wherein the phrase " lock-and-block " was used for the first time in any patent specification. The patent, moreover, specified:—

> The movement of a signal lever for a train to proceed having the effect of locking that lever until the lock is released by the movement.

* The first article of this series appeared in our issue dated February 1, 1935.

of a lever at the next signalling point after the train has passed it, while the lever at the next station cannot be moved until freed by the movement of a lever at a third signalling point showing that the line between the second and third points is clear.

The idea in the mind of Mr. Sykes was that signalling movements should be made in sequence. The home signal at a box must be lowered before the starting signal; the starting signal could not be lowered unless the block instrument indicated line clear acceptance from the next box in advance; train-out-of-section could not be sent until the home signal had been restored and the train had passed over the electrical contact beyond the starting signal. The need for the restoration of the home signal before the line could be cleared; the need for the home signal subsequently to be lowered before the starting signal; the need for the starting signal to be released from the box in advance and, finally, the need for the train to have proceeded on its journey before train-out-of-section was sent, necessitated the signals being worked in sequence, and for every train. That was the basis of the Sykes lock-and-block, and therein he went farther than Preece and Spagnoletti.

It may be added that in the same patent provision was made for the application of the idea to single lines of railway, and this arrangement was carried out on the Dulverton branch of the Great Western Railway in November, 1881, and on the same company's branch from West Drayton to Staines in July, 1883.

In 1880, by his patent No. 1907, Sykes made a great advance in that he introduced a back-lock on the signal lever, by which, whilst the signalman could put the lever sufficiently far towards the normal position to restore the signal, he could not put it fully back until the lock had been withdrawn by the passage of the train over the rail contact. Thus, as Mr. T. S. Lascelles said in his paper on lock-and-block at the Institution of Railway Signal Engineers on May 13, 1925:—

> The putting back of the lever itself no longer unlocked the signal in the rear but unlocked the accepting handle or plunger of the block instrument, which could then be used to send the release when it was actually required. Thus, by means of the back-lock, the train controlled the sending of a second *line clear* signal.

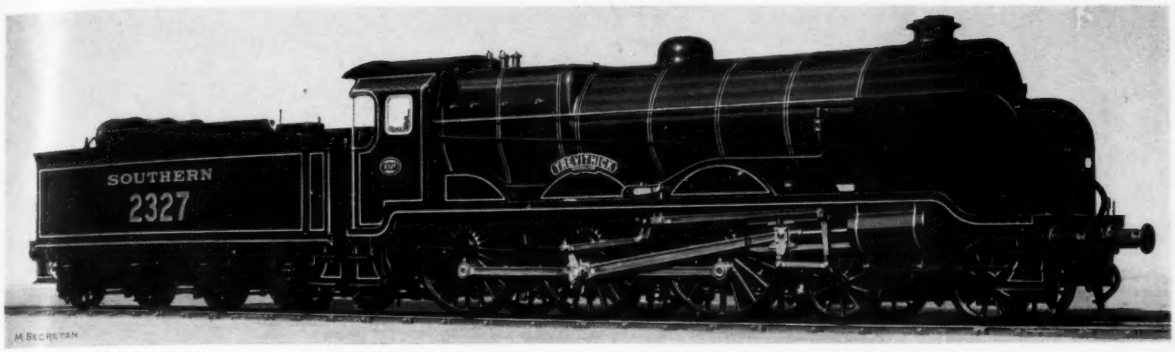
The gradual introduction of the Sykes system on the various railways is too long a story to be recorded here. It must suffice to say that in 1887 there were 1,000 levers on the L.C. & D. Railway controlled by lock-and-block; the system was in use on several sections of the London, Brighton & South Coast and to a small extent on the South Eastern. The whole of the Hull & Barnsley Railway was equipped on its opening in 1885 and the Mersey Railway and part of the Wirral Railway were similarly provided for in 1888. In June, 1892, the Sykes system was in use on eighteen railways, and on four of these—the L.C. & D., H. & B.. Metropolitan District and Mersey —it was installed throughout. From the paper to the Institution of Electrical Engineers by Mr. Hollins, referred to in our opening paragraphs, we learn that on the Great Eastern Railway, the directors, recognising the rapid growth of their enormous suburban traffic, and being determined to afford every assistance that the combination of electrical and mechanical apparatus could give to dealing safely and expeditiously therewith, decided to adopt, at a cost of little less than £25,000, the Sykes system over practically the whole of their suburban lines. At the time of the paper—1897—it was installed in 78 signal-boxes and equipped to 1,022 levers. Some of the boxes dealt with 1,000 trains a day and the average for all the 78 boxes was 31,556 trains daily.

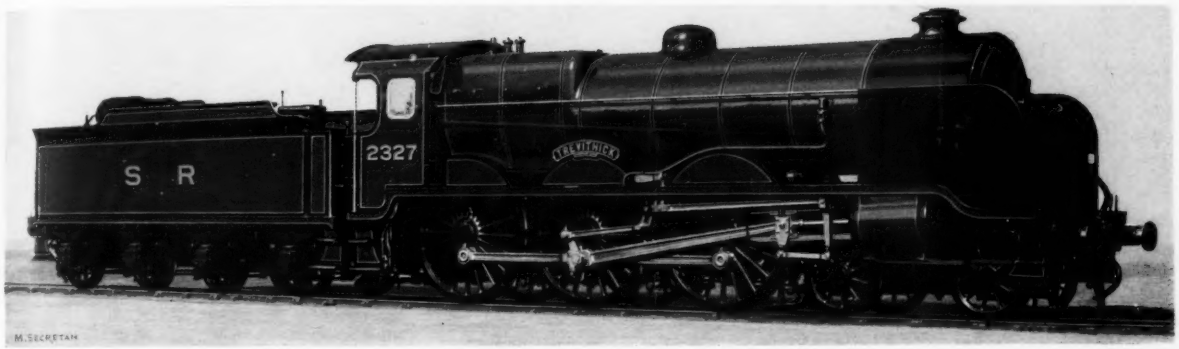
By the end of 1880 the provision of lock-and-block had been recommended, as a remedy against irregular block working, in nine reports of the Board of Trade Inspecting Officers, and during the two years 1881 and 1882 there were eight such recommendations. As an illustration, mention may be made of a collision that caused no little sensation at the time. One of the Midland Company's Scottish expresses broke down in Blea Moor tunnel on August 19, 1880, but it was irregularly cleared when a second express was detained at the box in the rear and the signalman there asked why he had not had train-out-of-section for it. On that occasion General Hutchinson remarked, "I would strongly recommend the officers of the Midland Company to look into the system that has been for some time in force upon parts of the L.C. & D. Railway and of the Metropolitan District Railway, whereby mistakes of the nature which led to this collision are rendered far less probable."

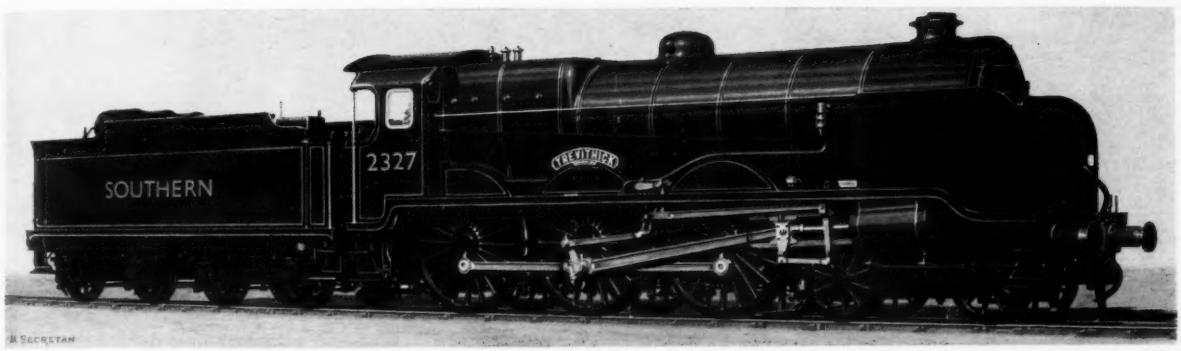
Mention must also be made of the fact that on August 19, 1875, electrically-operated repeater signals—designed by Mr. Sykes—were provided at each end of Penge tunnel L.C. & D., to repeat the two distant signals fixed in that tunnel, which is 1¼ miles long—the up distant worked from Sydenham Hill box and the down distant for Penge station. Those signals were the forerunner of the banner signal which is now an established feature in British signalling practice. Some four years later—on August 1, 1879—there was a collision in the Mansion House station which called for the provision of shunting signals. As a consequence, Sykes provided shunt-in and shunt-out electrically-operated signals that were worked by the turning of an electric switch after an initial movement of the lever of the relevant starting signal, and thus no additional levers had to be brought into use. In November, 1883, fifty such signals were fixed in the L.C. & D. station at Victoria and in March, 1887, a number of similar signals were provided at the Hole-in-the-Wall box there. All these remained in use until that terminus was resignalled after the war.

In May, 1892, there was completed a work in which engineers, signal engineers and operating officers all over the world became interested. We refer to the opening of the "A" signal-box at Waterloo, London & South Western Railway. The work was described in a paper by the late Mr. A. W. Szlumper, which appeared in the Proceedings of the Institution of Civil Engineers for Part I of the Session 1891-92. The author said that "although this new apparatus of 236 levers does not contain the greatest number of levers—ranking the third largest in this respect—yet the interlocking mechanism is arranged for working a greater number of points, facing point locks, signals, &c., than any one apparatus in existence." The Sykes lock-and-block was installed there, and many of Mr. Sykes' other apparatus which helped to make the installation the success it was and has been for over forty years. The Sykes reverser, colloquially known as the "banjo," was invented on that occasion, and another useful novelty was a buzzer to remind the signalman to put the lever to normal after the reverser had restored the signal arm.

Having brought the record of the development of lock-and-block down to the end of last century, we feel that we have covered the history of the pioneer work therein. We would therefore conclude by saying that one of the earliest developments of subsequent years was the proving of the distant signal, which was accomplished by it being essential that its arm should be in its normal position before *line clear* could be indicated for the acceptance of another train. Later, came a form of rotation locking; that, in effect, required the starting signal to have been restored behind a previous train before its corresponding home signal could be put to "clear" for a following train, and for *line clear* to be indicated from the box in advance before the signal for entering the section towards that box could be lowered.







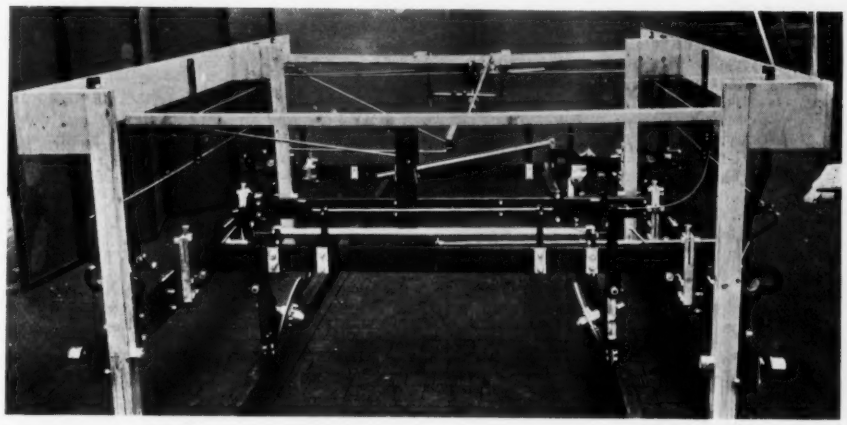
THE RAILWAY MAGAZINE

SUGGESTIONS FOR SOUTHERN RAILWAY LOCOMOTIVE LIVERY

(*See editorial article on page* 5)

DYNAMOMETER CAR TRACK INSPECTION EQUIPMENT, SWISS FEDERAL RAILWAYS

A description of the apparatus added to the dynamometer equipment, and of the functions of its various parts



Demonstration equipment to show working of Amsler apparatus

ALTHOUGH an improvement upon earlier manual track inspection, the push trolley gauge and cant recorder was still a slow and unsatisfactory form of permanent way testing apparatus, as its records took no account of any appreciable load on the rails. In 1925 this was followed by the Hallade inspection car, and more recently by the Sperry gyroscopic track testing car. These were all special units devoted to the recording of irregularities in the permanent way, but in 1930 the Great Indian Peninsula Railway ordered a dynamometer car from the Metropolitan-Cammell Carriage, Wagon & Finance Co. Ltd. that embodied certain track inspecting features of Amsler's design and was described in *The Railway Engineer* of November of that year. Meanwhile the Swiss Federal Railways had decided to add to their dynamometer car a track inspection equipment still more complete than that installed in the G.I.P.R. car, and entrusted Alfred J. Amsler & Co. of Schaffhouse with its supply. This equipment may be described as follows: the sketch diagram, Fig. 1, shows the layout of the apparatus, and Fig. 2 the exterior equipment of the car. In Fig. 3 may be seen the paper band on which the

References

1. Km., hm. and other marks.
2. Speed, in km./hr.
3. Curvature of rails.
4. Cant of track.
5. Width of gauge.
6. Rolling movement.
7. Unevennesses of left rail.
8. Unevennesses of right rail.
9. 2, 6 or 12 seconds marker.
10. Minutes marker.
11. Km., hm. and other marks.
12. Spare stylo.

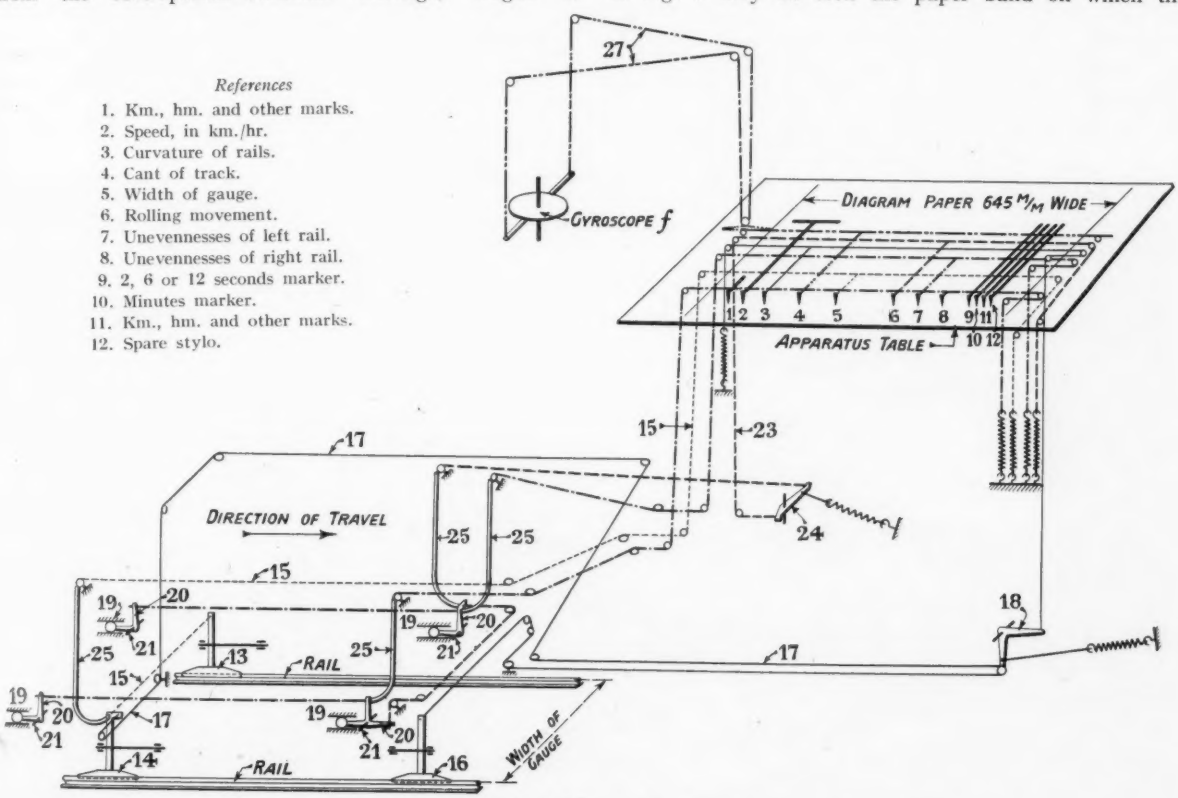


Fig. 1—Sketch diagram showing the complete layout of the car equipment

following records are plotted, while the train is travelling at about 30 m.p.h.:—

Pen and
Record No.

1. Mileposts and other identification marks, such as stations, bridges, tunnels, &c.
2. Speed in km.p.h.
3. Curvature of track.
4. Super-elevation on curves, drawn to a scale of 1 : 5.
5. Gauge, shown to actual scale.
6. Rolling motion of car body, shown to a scale of 1 : 2, including relative transverse motion between wheels and body, due to irregular spring deflection, as, for instance, on curves.
7. Irregularities in level of left-hand rail.
8. Ditto of right-hand rail.
9. Two-, six-, and twelve-second marks.
10. Minute marks.
11. Mileage and other marks as in 1.
12. Spare marker.

The pen carriers plotting records 2, 9, 10, 11 and 12 are operated by lengthening and bringing to the ordinates of the track inspection records the corresponding markers of the existing dynamometer table. Marker 1 is electrically coupled to marker 11, and facilitates the interpretation of the diagram.

The channel iron *b* in Fig. 2, which is suspended from the axleboxes of the bogie and is therefore unsprung, carries the various instruments for track testing. Exact gauge is measured by two shoes 13 (in Fig. 1) and 14, each about 2 ft. 2 in. in length, which are pressed against the inner rail faces by springs, the exact point of measurement being 0·6 in. below the rail table. Variations in gauge are continuously transmitted to recorder 5 by the cable 15. Similarly curvature is recorded by shoes 14 and 16 in. contact with the right-hand rail, the resulting graph being proportional to the angle between the rail curve and the longitudinal centre line of the car midway between the two right-hand shoes. Actually a differential system of cables 17, transmits the difference between the distances of the shoes from the car centreline through bell crank 18 to style 3 on the recording table.

Irregularities in the right and left rail levels are registered by bell cranks 20, which pivot about pins 21 carried on brackets fixed to the car underframe. The rollers at the extremities of the crank arms move in double guides 19, fixed to the channel *b* (Fig. 2) and perpendicular to the radius aligned to the bogie centre so as to make the rotation of the bogie ineffectual. The difference of vertical motion of the wheel centres relative to the car body, and therefore the irregularity of the rail level under the one wheel relative to the regular rail level under the other wheel is thus transmitted to pens 7 and 8 on the table, one for each rail. Rolling motion of the car body relative to the axles is taken up by the front pair of levers 20 and the difference is transmitted by a Bowden wire to pen 6 through cable 23. The diagram is normally drawn to a scale of 1:2, but this can be varied by adjustment of lever 24.

In order to eliminate vertical vibration in the cables, which are 2 mm. thick, they are led in tubes *e* (Fig. 2), and the transfer from the bogie to the underframe is by means of Bowden wires 25. Carefully adjusted springs also minimise vibration and therefore inaccuracy in measurement and plotting, and the inertia of the lever part of the measuring system is reduced to a minimum by the use of light metal deflection rollers on ball bearings. Any deflection or tendency to distortion of the channel iron measuring base on curves is prevented by the use of ball-and-socket instead of rigid joints between it and the transverse members of this recording base frame on the bogie axleboxes. The channel members are also padded with wood to avoid vibration. When the apparatus is not in use the shoes 13, 14 and 16 (Figs. 1 and 2) are turned upwards and hung from the underframe on hooks; the cables are disconnected and their ends hooked into special holders.

For recording the superelevation of curves, the gyroscope *f* shown in Fig. 3 is used, with vertical axis, suspended very nearly at its centre of gravity. The base *g* is rigidly fixed to the carriage body, in this case through the medium of a tool cupboard. The gyroscopic disc, enclosed in a light-metal casing *i*, is driven by a direct-coupled d.c. motor of about 870 W. capacity with shunt

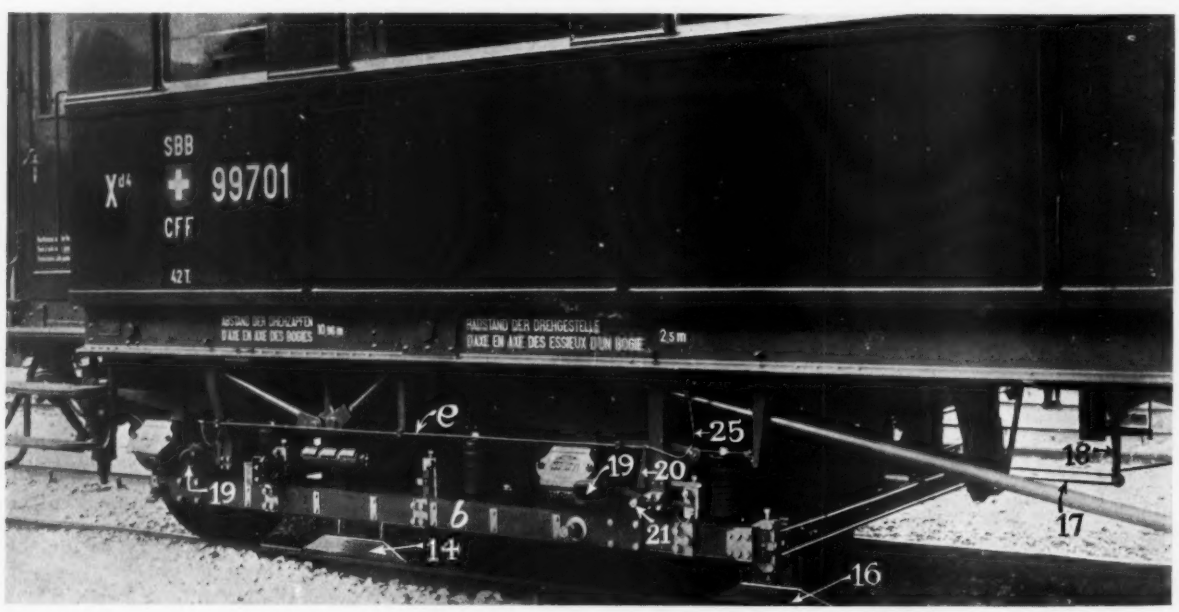


Fig. 2—Exterior equipment as installed on the bogie and underframe of the car : the figures relate to features in the text

excitation, and rotates at about 7,000 r.p.m. Current is supplied by a series of ordinary carriage lighting batteries. The free, self-oscillation of the gyroscope is of long period. For eliminating the interference caused by the movement of the carriage, four electro-magnetic stabilisators *h* are arranged at angles of 90°. The control of the gyroscope motor is effected by means of a switchboard, where a voltmeter and ammeter are also arranged to check up the current supplied to the motor. The variations in the inclination of the carriage body are composed of (*a*) cant of the track (difference in level of the rails in relation to the horizon) and (*b*) rolling movement of the carriage body. The apparent motion of the gyroscope relative to the car body, *i.e.*, the sum of the cant of the track, the rolling movement, and free oscillations of the gyroscope, are transmitted to the recording pen 3 on the measuring table by means of the two silk threads 27 running along the carriage roof.

As there was no room left on the table of the main apparatus of this dynamometer car for the gyroscope, it had to be set up on the tool cupboard at a distance. This necessitates the correction of the gyroscope graph for rolling motion, and for this purpose a special pantograph is used. The correction is made purely mechanically, by circumscribing both graphs at the same time, the rolling movement being automatically transferred from the scale 1:2 to the scale 1:5 (corresponding to the two different diagram scales) and deducted from the gyroscope diagram placed above; the true cant of the rails is directly drawn in coloured ink. This unfortunately entails loss of time, and in an inspection car designed exclusively for track recording, the gyroscope would, of course, be accommodated on the apparatus table itself, and the deduction of the rolling motion from the gyroscope diagram would be made automatically. The gyroscope record would then represent the true cant of the track, and the recording of the rolling movement could be dispensed with or not, as desired. When not in use the gyroscope rotor can be fixed and supported by means of a screw in the table.

The diagram paper *a* (Fig. 3) moves in the direction of the arrow at a speed of 200 mm. for each km. run, a speed which makes it possible to recognise the records made at individual rail joints, as the length of an 18 m. (59 ft.) rail is shown on the diagram by a measurement of 3·6 mm.

By means of a special arrangement on the electric contact of the kilometre marker on the measuring table at the start, the diagram is set to the particular kilometre on the track at the start of an inspection trip. An electric horn signal draws the attention of the operator stationed at the measuring table when passing each kilometre stone. By pressing on the button 28 (Fig. 3), the stylos of the markers 1 and 11 are deflected, to mark on the diagram bridges, tunnels, crossings, &c., as they are passed by the inspection car, in order to localise readings. A window at the rear end of the car facilitates the observation of the track. The measuring and recording apparatus described above permit the inspection of close on 200 km. of track a day.

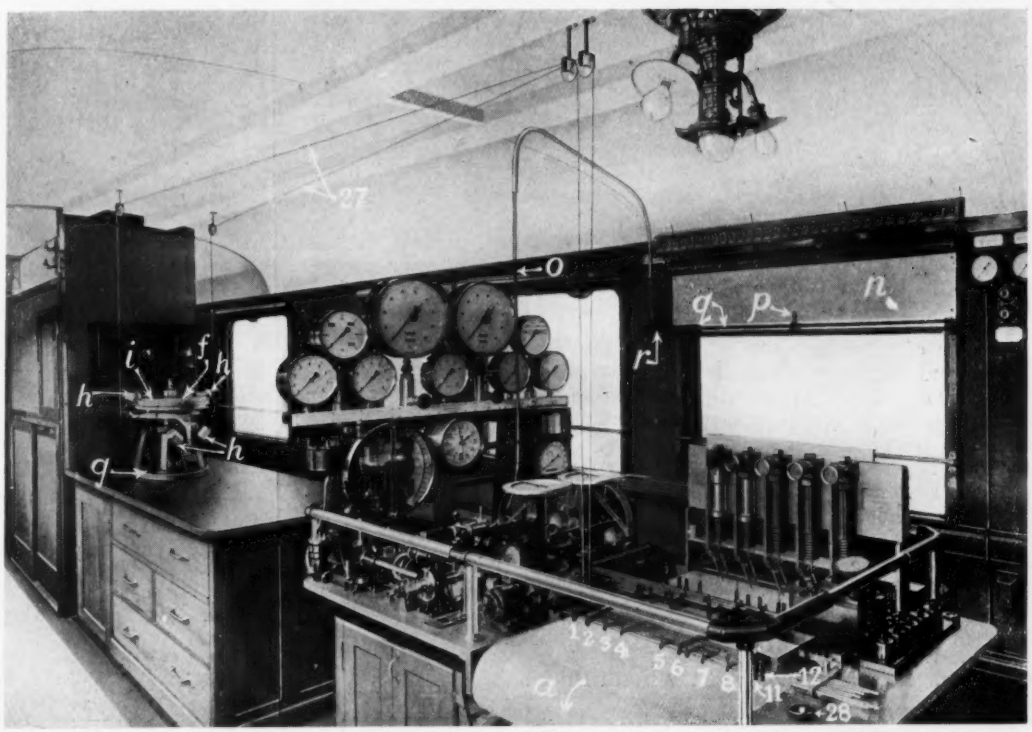


Fig. 3—*Interior equipment showing the paper band complete with* 12 *pens in the foreground : behind is the gyroscope and its accessories*

Another attachment, which was added to the dynamometer car at the same time, automatically shows the position of the car on the track. The plan of the track to be investigated is pinned to the board *n* (Fig. 3) fixed in front of the recording table. The flexible shaft *o* driven from the measuring table actuates the pointer *p* which slides on the horizontal spindle *q*. A reversing gear *r* allows the pointer *p* to be moved forwards or backwards, *i.e.*, from left to right or *vice versa*.

L.M.S. ORDERS FOR 369 LOCOMOTIVES

Contracts have been placed with three firms under the Government Guaranteed Loan for railway schemes

IN the afternoon of December 20 the London Midland & Scottish Railway Company announced that it had placed contracts amounting to £2,800,000 for 369 steam locomotives and 270 passenger carriages, embracing two of the items of work included in the programme of reconstruction and improvement under the Government Guaranteed Loan authorised by the Railways (Agreement) Act, which received the Royal Assent that day. The list of works to be undertaken by the company is set out in the first Schedule to the Act, and the contracts now placed are in respect of paragraphs 3 and 4. The orders for the new locomotives have been placed with the following firms:—

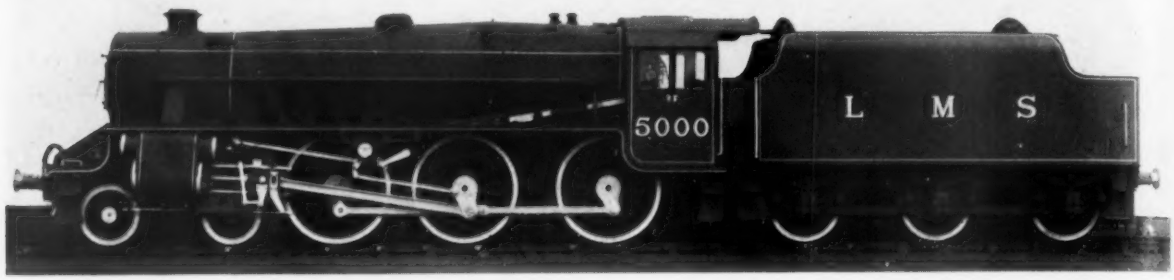
227 4-6-0 mixed traffic tender engines with Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd., Newcastle-on-Tyne.

69 2-8-0 freight tender engines with the Vulcan Foundry Ltd., Newton-le-Willows, Lancashire.

73 2-6-4 passenger tank engines with the North British Locomotive Co. Ltd., Glasgow.

Apart from the additional employment caused by the construction of these locomotives and carriages (details of the latter are given on page 38), the work will involve the use of some 40,000 tons of steel and 5,000 tons of non-ferrous metal, which will provide additional employment in the production of the raw and semi-manufactured materials required.

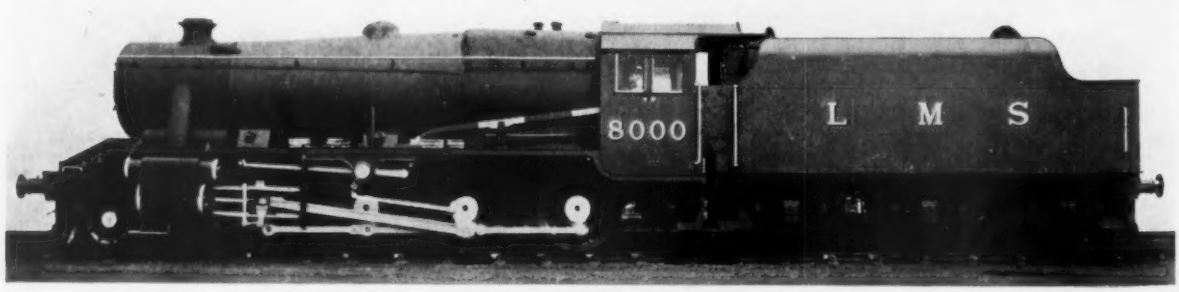
All the new locomotives will be of the two-cylinder type. The mixed traffic engines are for the working of both express passenger and freight trains; the 2-8-0 freight tender engines will be used for the working of through mineral trains, and the 2-6-4 passenger tank locomotives for suburban services. Eight of the last mentioned locomotives are at present being built at the company's works at Derby and it is the first of this series No. 2537 that is illustrated opposite.



4-6-0 two-cylinder mixed traffic engine

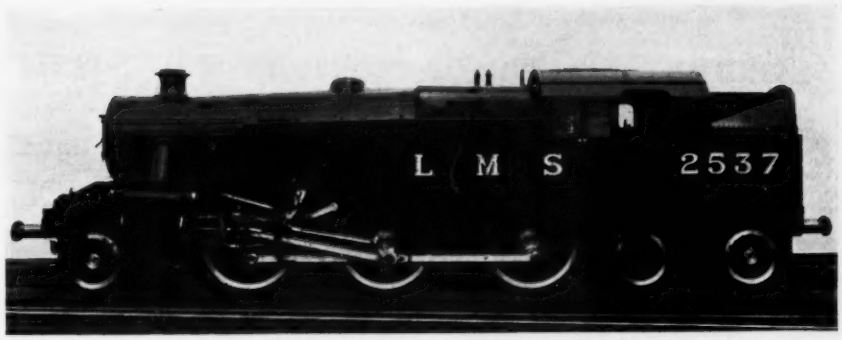
The following are the leading dimensions of the three classes of locomotives covered by the new contracts:—

	4-6-0 Mixed traffic	2-8-0 Heavy freight	2-6-4 Passenger tank
Cylinders, diam. ..	18½ in.	18½ in.	19½ in.
Piston stroke	28 in.	28 in.	26 in.
Wheels, coupled, diam.	6 ft.	4 ft. 8½ in.	5 ft. 9 in.
Wheelbase, coupled ..	15 ft.	17 ft. 3 in.	16 ft. 6 in.
,, engine, total	27 ft. 2 in.	26 ft.	38 ft. 6 in.
Boiler, heating surface—	Sq. ft.	Sq. ft.	Sq. ft.
Firebox	155·0	155	137
Tubes	1,425·8	1,308	1,031
Total (evaporative)	1,580·8	1,463	1,168
Superheater	256·2	235	185
Combined total ..	1,837·0	1,698	1,353
Grate area ..	27·8 sq. ft.	27·8 sq. ft.	25·0 sq. ft.
Boiler pressure ..	225 lb.	225 lb.	200 lb.
Weight of engine and tender in working order ..	125 tons 5 cwt.	124 tons 12 cwt.	91 tons
Water capacity of tender or tanks..	4,000 gallons	4,000 gallons	2,000 gallons
Coal capacity of tender or bunker	9 tons	9 tons	3½ tons
Tractive force (85 per cent. b.p.) ..	25,455 lb.	32,438 lb.	24,670 lb.



Two-cylinder 2-8-0 heavy freight locomotive

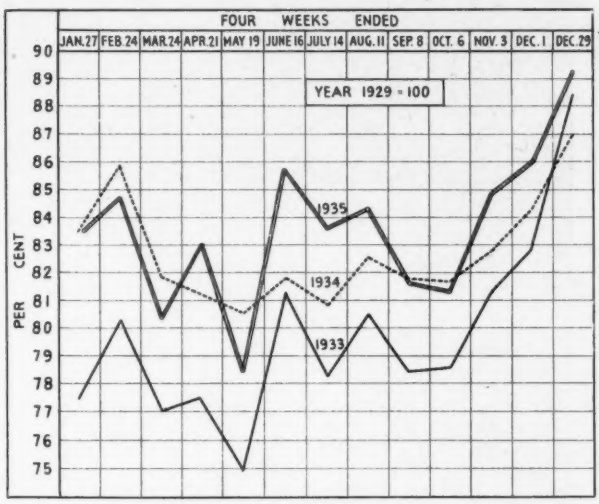
The 4-6-0 and 2-8-0 type engines with tenders are the same in all respects as those already in service and the only real difference between the 2-6-4 tank engines, and their predecessors is that the number of cylinders is reduced from three to two, with a corresponding re-arrangement of the cylinder dimensions. The regulator is located in the steam dome instead of in the smokebox as was done in the previous 2-6-4 type tank and 4-6-0 mixed traffic engines.



Two-cylinder 2-6-4 type passenger tank engine

Comparative Railway Traffic Analysis

The year 1929 was the last moderately good year enjoyed by the British main line railways and has been taken as the datum year with which to compare the percentage variations in gross receipts from it which are shown in the accompanying graph and table for the years 1933, 1934, and 1935. For the whole year 1929 the gross traffic receipts amounted to £180,509,000. In 1933 the corresponding figure was £143,855,000, representing 79·7 per cent. of the 1929 receipts. A considerable improvement over 1933 was shown in 1934, when the receipts were £149,246,000, or 82·7 per cent. of the 1929 figure, but 1935 did not show much variation on 1934, as gross receipts were £150,797,000, or 83·5 per cent. of those of 1929. The 1935 results are in close accord with the forecast made by Mr. W. V. Wood, Vice-President, L.M.S., when giving evidence before the Railway Rates Tribunal in May last. In comparison with 1934 the first 12 weeks of 1935 showed a decrease of £349,000, but the next 12 weeks gave an improvement of £481,000, and the 15 summer weeks an improvement of £538,000, and in the 13 weeks of autumn and winter the advance was as much as £881,000.



Four-weekly total railway traffic receipts of the main line companies—years 1935, 1934 *and* 1933 *standardised on* 1929

TRAFFIC RECEIPTS, FOUR GROUP COMPANIES, 52 WEEKS (0000's OMITTED)

Four-weekly Periods to	1929			1933			1934			1935		
	Pass.	Goods	Total	Pass.	Goods	Total	Pass.	Goods	Total	Pass.	Goods	Total
January 27	473	769	1,242	382	580	962	387	650	1,037	399	639	1,038
				80·76	*75·42*	*77·46*	*81·82*	*84·53*	*83·49*	*84·32*	*83·08*	*83·56*
February 24	443	803	1,246	384	616	1,000	392	679	1,071	395	661	1,056
				86·68	*76·71*	*80·26*	*88·49*	*84·56*	*85·96*	*89·16*	*82·32*	*84·75*
March 24	483	856	1,339	405	626	1,031	407	690	1,097	407	669	1,076
				83·85	*73·13*	*77·00*	*84·27*	*80·61*	*81·93*	*84·27*	*78·15*	*80·36*
April 21	605	772	1,377	507	560	1,067	499	620	1,119	502	641	1,143
				83·80	*72·54*	*77·49*	*82·48*	*80·31*	*81·26*	*82·98*	*83·03*	*83·01*
May 19	568	821	1,389	446	595	1,041	486	633	1,119	497	593	1,090
				78·52	*72·47*	*74·95*	*85·56*	*77·10*	*80·56*	*87·50*	*72·23*	*78·47*
June 16	599	746	1,345	549	544	1,093	518	582	1,100	547	606	1,153
				91·65	*72·92*	*81·26*	*86·48*	*78·02*	*81·78*	*91·32*	*81·23*	*85·72*
July 14	699	783	1,482	591	570	1,161	611	588	1,199	630	609	1,239
				84·55	*72·80*	*78·34*	*87·41*	*75·10*	*80·90*	*90·13*	*77·78*	*83·60*
August 11	889	725	1,614	757	542	1,299	774	557	1,331	805	556	1,361
				85·15	*74·76*	*80·48*	*87·06*	*76·83*	*82·47*	*90·55*	*76·69*	*84·32*
September 8	761	814	1,575	640	596	1,236	655	633	1,288	664	622	1,286
				84·10	*73·22*	*78·48*	*86·07*	*77·76*	*81·78*	*87·25*	*76·41*	*81·65*
October 6	644	821	1,465	524	627	1,151	537	660	1,197	538	653	1,191
				81·37	*76·37*	*78·57*	*83·39*	*80·39*	*81·71*	*83·54*	*79·54*	*81·30*
November 3	535	825	1,360	446	658	1,104	454	672	1,126	457	698	1,155
				83·36	*79·76*	*81·18*	*84·86*	*81·45*	*82·79*	*85·42*	*84·61*	*84·93*
December 1	479	843	1,322	408	688	1,096	417	697	1,114	418	719	1,137
				85·18	*81·61*	*82·90*	*87·06*	*82·68*	*84·27*	*87·27*	*85·29*	*86·01*
December 29	556	739	1,295	494	651	1,145	506	621	1,127	502	653	1,155
				88·85	*88·09*	*88·42*	*91·01*	*84·03*	*87·03*	*90·29*	*88·36*	*89·19*
Total 52 weeks	7,734	10,317	18,051	6,533	7,853	14,386	6,643	8,282	14,925	6,761	8,319	15,080
				84·47	*76·12*	*79·70*	*85·89*	*80·28*	*82·68*	*87·42*	*80·63*	*83·54*

ELECTRIC HEATING OF POINTS IN SNOW, ITALIAN STATE RAILWAYS

As a measure for effecting considerable labour economies, a system of electric heating for stock rails has been installed at Milan

IN the larger station yards, such as Milan, considerable difficulty and expense have hitherto been involved in keeping points clear of snow during the severe winters often experienced in Italy. To ensure the prompt action, day or night, necessary to avoid delay to traffic, a considerable permanent staff has had to be maintained, as well as temporary reliefs in case of continued snowfall. As a measure of economy and safety, some other method of keeping the slide chairs, switch blades and stock rails clear of snow has therefore been sought.

Approach to Milan Central station in winter, showing switches free of snow due to the use of electric heaters

Experiments with the heating of points have been made since the winter of 1932-33, by providing a number of points with special devices which caused the melting of the snow by steam, hot water, or electricity. During the heavy snowfalls in 1933 the superiority of electric heating was clearly established on account of its simplicity, effectiveness, low cost of installation, and the easy upkeep.

One type of electric equipment at the time of these experiments consisted of single elements, three or four fixed to each stock rail. Another type of heater comprised elements of approximately the length of the stock rail, consisting of an insulated resistance protected by a metallic tube which was fixed over its whole length to the stock rail. A third heater consisted of copper bands fixed to the web and connected with the secondary of a transformer which supplied heavy current at the low tension of $1\frac{1}{2}$ to 3 volts.

All the types proved satisfactory, but it appeared advisable to adopt a type which would be capable of distributing the required amount of heat without subjecting individual parts to excessive heat. The second type was chosen in preference to the copper band system, as the heavy current required by the latter would have necessitated the installation of transformers for each set of points. Further experiments were carried out with the tubular heaters on the Brenner line at temperatures as low as $-9°C.$ ($-16°F.$), and, as equally satisfactory results were obtained, a scheme for heating 439 points at Milan station was approved by the Ministry of Communications.

Some 249 points, 164 double slip and 26 single slip points were therefore fitted with electric heaters, of which 1,206, corresponding to the number of blades, were required. The existing transformer cabins were used for supplying current to the heaters, new transformers being added in one or two cabins. The feeder circuits from these cabins are connected with the primary of the special transformers installed at suitable points of the station. Each 3-phase circuit feeds groups of 10 or 20 of these special transformers at 220 and 440 V respectively. Each of the transformers feeds six secondary single-phase circuits up to 1·1 kW. per circuit. The transformers are of the oil-immersed self-cooling type.

The heaters consist of a copper tube 2 mm. (0·079 in.) in thickness, which has a D-section over its useful length —the length of the tongue to be heated—and of circular section over a short length which forms the junction with the feeder. The inside of the tube is filled with blocks of refractory material of the same section, through which run two longitudinal ducts of 4 mm. (0·157 in.) diameter, near the flat side of the tube. The blocks have longitudinal cut-outs in correspondence with these channels.

An electric resistance, consisting of a single nickel-chrome wire runs through the channels and projects through the end block which closes the tube: the other end of the tube is sealed with a plate welded on to the tube. The ends of the nickel-chrome wire are enclosed in a copper tube in order to limit the heating to the D-section only. The nickel-chrome wire has a high percentage of chromium but no iron. The co-efficient of expansion is 0·0001, the diameter is 2·095 mm. (0·082 in.), the section 3·30 sq. mm. (0·0051 sq. in.), the resistance per linear metre is 0·324 ohm. The power assigned to each heater is 1·1 kW. (20 amp., 55 volts). The low voltage made the use of a thick wire possible, and this, together with the characteristics of the metal, ensures a high mechanical resistance and practically unlimited life.

The heating installation functioned, during the winter of 1933/34, for 92½ hr. with a consumption of 129,400 kWh., the cost of which was about £300. Careful calculations made on the basis of previous years show that manual labour would have required an expenditure of £5,800. As the cost of the installation was £20,700, and calculating interest and amortisation of the plant, upkeep and consumption of current, the saving effected by the installation amounted to nearly £3,000. As it happened, the winter 1933/34 was a rather mild one and snow fell on only 7 days, which is quite unusual for Milan, otherwise the saving would have been much greater. The whole installation has been enlarged during the summer of 1934 and all points at Milan are now electrically heated. Several other stations, amongst them the Brenner and Bologna, have been equipped with these installations, and plans have been worked out for adopting the same system to other stations also.

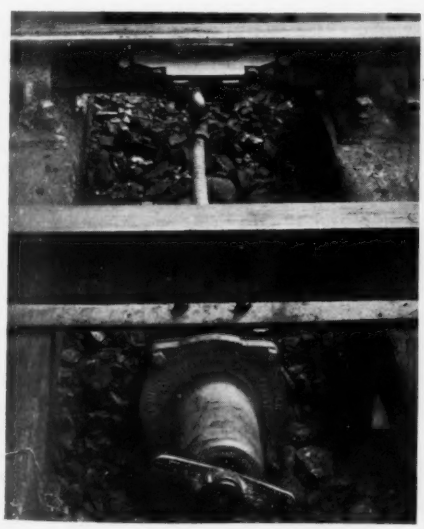
Near view of electric heater for switch

Surge Rail and Flange Lubricator

THIS machine operates by means of a small applicator plate, in contact with the gauge side of the rail head, being depressed by the passing vehicle wheel flange. The depression of this plate releases a certain quantity of graphite paste lubricant from a main grease container, where it is under constant pressure, into a small surge chamber.

Between depressions the entrained air or gasses in the lubricant cause this small quantity to flow from the surge chamber along channels cut in the applicator plate on to the side of the rail head, and the wheel flanges of passing vehicles spread this paste along a considerable length of rail. The device is simple and entirely automatic, and functions only on the passing of traffic.

A particular point to be noted in connection with this Surge machine is that the lubricant on contact with wheel flanges extends a lasting graphite film along the running side of the rail head. The type of lubricator illustrated has been perfected as a result of several years of track experience and is a very considerable improvement over the type first put down. A number of them are in operation on the L.M.S. and G.W. railways. On the L.M.S. they are installed at Willesden Junction, Harrow, St. Albans, and Weedon. The G.W. has them on the Plymouth, Taunton, Gloucester and Wolverhampton Divisions. We have ourselves examined these machines in the track and have found the high rails ahead of the installation well lubricated.



Surge rail lubricator fitted on an electrified line

Outside England machines have been despatched to the Belgian National Railways, the Kaiochow-Tsinan and Peiping-Liaoning lines in China, the Egyptian State Railways, the Rhodesia Railways, and the Great Indian Peninsula and South Indian Railways in India. The Surge lubricator is made by the P. & M. Co. (England), Limited.

TRAIN DESCRIBERS

Illustrating, in particular, the Ribbon Storage Train Describer of the Westinghouse Brake & Signal Co. Ltd., as recently installed at Fenchurch Street, L.N.E.R.

SOME means of communication has always been necessary for informing signalmen at junction boxes of the route required by an approaching train. The general practice is for the driver, at a pre-determined box in the rear of the junction, to give a whistle, as laid down in a whistle code, intimating the direction desired. In pre-telephone days that intimation was sent forward to the junction by supplementing the Is-line-clear? block signal by an additional number of beats, again in accordance with a code. For places where the description, as well as the destination, of the approaching train is necessary, there may be provided a train-describing instrument in the transmitting box and a corresponding instrument in the junction box. All these arrangements have worked satisfactorily as far as they have gone; their use, however, is limited. The bell code, for example, can cover only the one train that is approaching and cannot describe the next or any others that may be immediately following —information sometimes very necessary. The train describer, it is true, while providing for only one train at a time, can transmit a sequence of indications if the receiving signalman makes a note of each before it is cancelled in readiness for the next. A disadvantage of such a train describer is, however, that should a record not be made and the signalman instead relies upon his memory, he may, when dealing with three or more trains, forget the order in which they have been signalled to him.

On the principle of giving honour where honour is due, and, moreover, of recording an item of importance in railway signalling history, it should be remembered that the first automatic signalling on the Metropolitan District Railway was on the Ealing and Harrow line when it was opened in June, 1903. That work was carried out by the Westinghouse Brake Company and it was so satisfactory that the same firm was given the contract for resignalling the whole of the District Railway. In a description which appeared in a technical journal on May 25 and June 1, 1906, it was said that prior to the opening of the automatic signalling there were, intermediately between South Kensington and Minories Junction, thirteen signal boxes, but all had been closed except that at Mansion House station.

The elimination of those boxes brought about, however, the difficulty that, for instance, the man at South Kensington would not know the direction of the series of trains that were approaching him from Mansion House. That led to the introduction of the magazine train describer which Mr. W. C. Acfield, in his paper on " The Development of Main Line Signalling on Railways," read to the Institution of Electrical Engineers in 1915, said was " one of the many ingenious inventions of Mr. H. G. Brown " —now the Deputy Chairman of the Westinghouse Brake & Signal Company. By that means the man in Mansion House signal box could send to South Kensington the destinations, in their proper order, of up to 15 consecutive trains. The arrangement also provided for the order and destinations of trains to be exhibited on the destination boards at stations. The arrangements, for the signal boxes and the stations, was described in a paper on " Signalling on the London Underground Railways " read at the Institution of Railway Signal Engineers on November 12, 1924, by Mr. W. S. Every, now the Signal Engineer, L.P.T.B.:—

> The signalman at the end of the line or section sends a description of each train as it leaves him. These descriptions are received and stored up at both stations throughout the section and in the signal box at the end thereof, and are shown up on signs in their correct order. As each train passes out of a station or section, the description applying to that train is automatically cancelled and that of the following train is shown up in its place. The descriptions are transmitted from one end of a section to the other by means of four units only; for reference purposes these units are lettered A, B, C, D, and by arranging suitable combinations of these letters fifteen different descriptions can be obtained.

Some time in 1931 a new form of train describer was introduced on the Underground and it was used on the Northern Extension when it was opened to Arnos Grove on September 19, 1932, and on to Cockfosters on July 31, 1933. It is also the property of the Westinghouse Brake Company. The signal box responsible for sending a description throughout an area—say the box at Hammersmith for the line to Arnos Grove—had a transmitting instrument, and at each station in the area is a receiving instrument. There is no reasonable limit to the number of receiving instruments connected to the transmitting instrument.

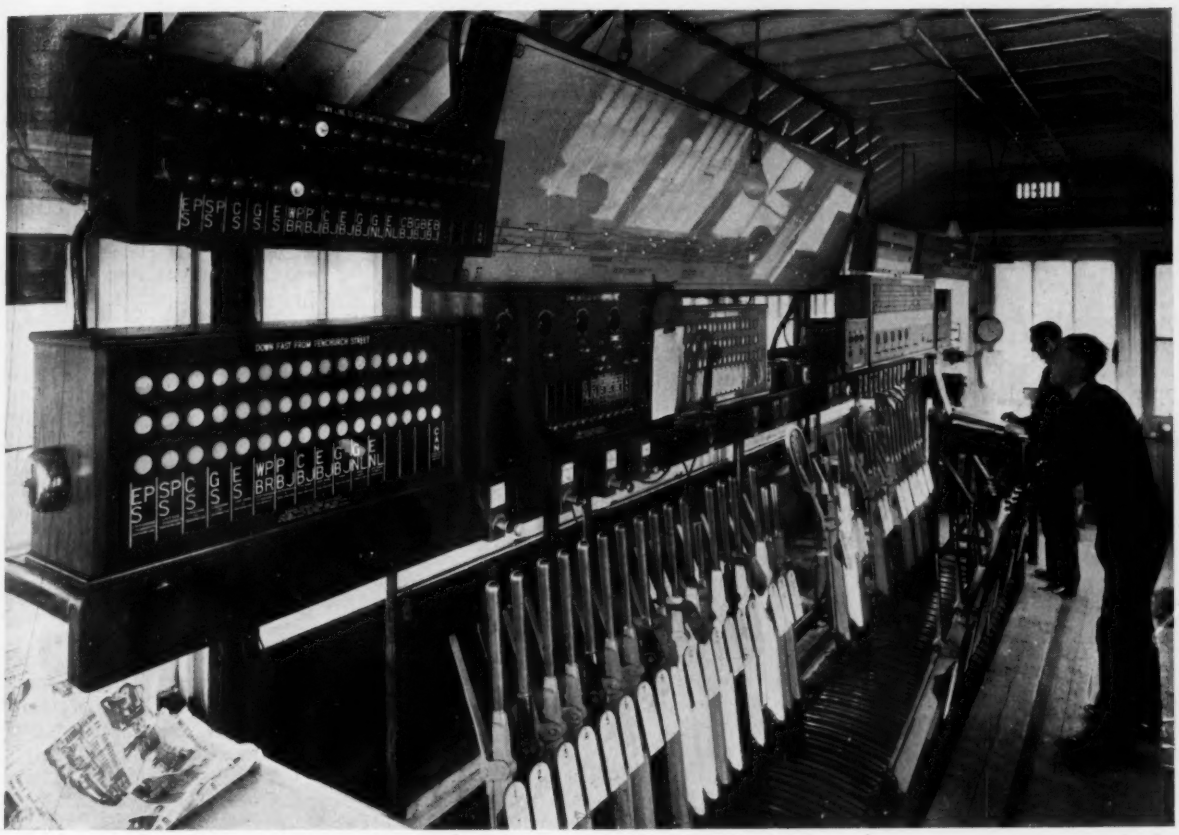
The transmitting instrument has two drums, side by side; that on the left is for indicating those stations at which the train to be described does not stop and that on the right thereof is for intimating its destination. Provision is made for 15 non-stop stations and 12 destinations. On the left-hand drum there are therefore 15 rows of studs and on the right-hand drum there are 12 rows. The studs in each row are so arranged as to make a combination that is different to any combination possible from the studs in the other rows.

On the face of the transmitting instrument is a pointer for each drum. To transmit a message as to the destination the right-hand pointer is turned to the name of the destination desired. If the train about to be described does not stop at a certain station or certain stations, the left-hand pointer is turned to the index letter that applies to the station or stations intended—the same index will cover more than one station when required. If it is to call at all the stations the non-stop pointer will be turned to *Nil*.

Within the transmitting instrument is a rotary switch, provided with a step-by-step magnetic ratchet drive, together with controlling relays for operating it when the signalman presses in the plunger at the outer end of the shaft carrying the destination drum. The armature of the electro-magnet of the ratchet has a suitable number of contacts to provide for the required destination and non-stop indications. There are thus 12 destination and 15 non-stop contacts, and a further 8 contacts for a supplementary purpose to be described in a moment. Two line wires communicate between the transmitting instrument and all the receiving instruments concerned, in each of which is a paper ribbon, drawn off a drum by another electro-magnetic ratchet drive.

When the plunger within the pointer of the destination drum is pushed in, current passes over the line wires by impulses. There are, first, the 12 impulses for the destination; then the 15 for the non-stop stations, and the final

8, already mentioned, are for spacing the indications so as to separate those for each train. Normally, the impulses are negative, but when the commutator of the electro-magnet of the ratchet is joined electrically to one of the stud combinations the polarity is reversed and the positive polarity causes the relay of a punch to be energised so that, concurrently with the ribbon being moved forward for the usual single space, a hole is made in the ribbon. That relay is then at once de-energised and negative impulses are continued. When the 35 impulses are completed, the ratchet drive is automatically stopped and the ribbon is stored up by hanging down within a storage receptacle. Current then returns over the line wire and



Train description apparatus at Stepney East

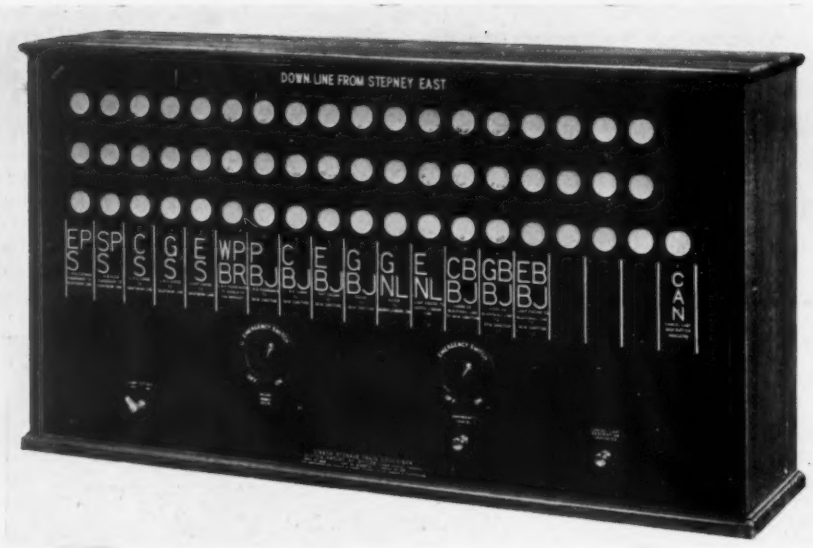
releases a lock on the plunger in the transmitting instrument—which has been holding it against further use—so that the plunger is automatically restored ready for use when the description for the next train has been set up. Obviously, there will be a number of descriptions stored up in a receiving instrument, particularly at those which are farther from the transmitting station.

When a train leaves a station or has passed a non-stop station, a track circuit at the outgoing end switches out the displayed indications and causes the ribbon to be drawn over a contact wheel. When a perforation is met with the non-stop and destination stations needed for the next train are illuminated on the train destination board. The ribbon is then drawn on to a rewinding drum.

At Fenchurch Street the ribbon type of train describer, supplied by the Westinghouse Brake & Signal Company, has been used, but there it is employed solely for intimating to signalmen the type and destination of approaching trains. There is no need for train destination boards on the platforms, but they could be added if necessary.

It will be remembered from our description of the signalling in the Fenchurch Street area in our issue of May 17, 1935, that there is automatic signalling on the down and up fast lines and the down and up slow lines between Fenchurch Street and Stepney, and on the double line between the latter point and Gas Factory Junction. Provision has been made for a 3-minute service on all the former four lines, and a 1½-minute service for the double line portions. As there thus will be more than one train on each line in the territory between Fenchurch Street and Stepney and between Stepney and Gas Factory Junction, train describers have been necessary so that Fenchurch Street box may intimate to Stepney the approach and destination of all trains on the down fast and on the down slow, and, in Stepney box, means for passing on this information to Gas Factory Junction are required. For the up line the latter box intimates the information to Stepney, and it is passed on thence to Fenchurch Street. Trains from Blackwall entering upon the main line at Stepney and on to the down line from off Salmon's Lane Curve have to be signalled forward by means of what is known as an interposer, whereby Stepney interposes the description and destination of such a train.

What may be called the receiving boxes, *i.e.*, Stepney and Gas Factory Junction on the down line and Stepney and Fenchurch Street on the up line, need to know the order in which the trains will arrive, and so the receiving instruments for the down fast line at Stepney and for the



Down line receiver, Gas Factory Junction

down line at Gas Factory Junction, which we illustrate herewith, and those for the up fast and the up slow lines at Fenchurch Street, which are at the left-hand end of the upper part of the locking frame in that box (see illustration on page 977 of our issue of May 17), have three rows of indicators; the top row is for the next train, known as the 1st train, approaching; the middle row is for the 2nd train, and the bottom row for the 3rd train. Thus the illumination of the top disc above E.P.S. in Gas Factory Junction would signify that the 1st train approaching from Stepney East was an express passenger for Southend; the middle disc in the row above E.N.L. would mean that the 2nd train was a light engine for the North London line; the bottom disc above P.B.J. intimates a passenger train for Bow Junction.

The transmission, as illustrated by the instrument in Fenchurch Street box, is done by the signalman first pressing in the plunger in the base of the instrument that applies to the destination desired. That sets up the description and if it is operating correctly the lamp immediately above that particular plunger is illuminated. That gives the signalman an opportunity to check himself, and should he have made a mistake he can at once cancel the set-up by the depression of the reset key on the upper right hand of the instrument. Such cancellation can readily be done, as the transmission does not take place until the train actually leaves and passes over a predetermined track circuit on the outgoing line. The transmission so sent is reported by the pertinent lamp in the upper row of lamps which intimates "Last Description Transmitted."

In the event of a train leaving that has not been described, the occupancy of the track circuit would cause the sign "not described" to be illuminated and an alarm bell to ring until the appropriate indication had been set up. In the case of failure of this track circuit an "emergency transmit" key, which is provided to cut out the track circuit control, is used to send the indication forward.

An interesting feature is the selection given to the up line transmissions from Gas Factory Junction to suit the up fast or the up slow line taken at Stepney and so to reach the required receiver instrument in Fenchurch Street box. That is effected very simply by selection by the junction home signal levers and the actual transmission is done by the occupancy of specified track circuits. On the train's arrival in Fenchurch Street, certain track circuits have to be occupied and then cleared and the requisite arrival signal or signals have to be put to "clear" in order to withdraw the transmission. Every such clearance of an indication, whether at Fenchurch Street, Stepney or Gas Factory Junction, extinguishes the 1st train indications, changes 2nd into 1st, 3rd into 2nd, and causes the next that is stored up to appear as 3rd train. For the trains that leave the various goods depots at Fenchurch Street, the requisite transmitter, *i.e.* the down fast or the down slow, is set up by the signalman when he is in a position to allow the train to depart, but the actual transmission is done by the occupation of a specific track circuit at the outlet from the goods warehouse connection, supplemented by the lever of the departure signal concerned being put to reverse.

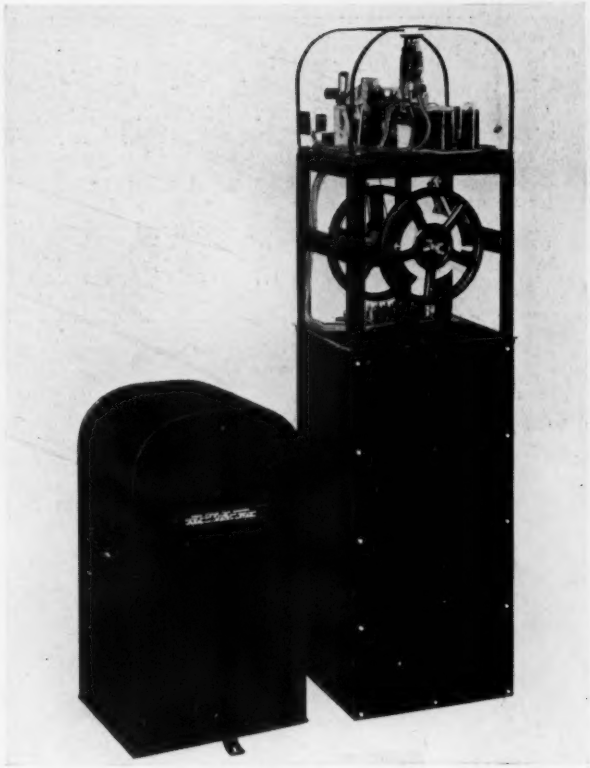
In the ribbon storage train describer installed in the present work, a paper ribbon is used and the descriptions and destinations are transmitted from point to point by approximately half-second impulses. These are equal in number for every description but some impulses may be reversed by polarising the line wire at the transmitting end. There are, then, normal and reverse impulses. At the receiving end this discrimination is offered in a very simple and positive manner by means of two relays and

Down slow line transmitter, Fenchurch Street

two small rectifiers in the receiver instrument seen in another illustration. This instrument feeds forward the paper for every impulse, whether normal or reverse, and perforations are made in the ribbon at every reverse impulse. The various descriptions are then distinguished from each other by the relative position of the perforations, which are subsequently read off by the receiver on to the relays in order to produce the indications intended. No equipment is therefore needed for counting the number of impulses, as they are constant, and all that is required is to distinguish between the normal and reverse impulses. The description, as received, is checked by individually testing each impulse in the transmission to determine that the paper has been fed forward in the receiver. The ribbons can, of course, be dated and timed and kept as a record. Ample provision, needless to relate, is made for correcting any accidental errors, to cancel any signals that are subsequently found to be unnecessary, and to safeguard the working in emergencies.

The apparatus is operated from the 660-V. a.c. mains, by means of rectifier units supplying 50 V. d.c. to the train describing apparatus. A small battery of 20 a.h. capacity is also provided as a stand-by and receives continuously a sufficient trickle charge to keep it in condition. In the event of the a.c. supply failing, or being momentarily cut off, the battery will continue the service of the train describer equipment. The d.c. relays are of robust construction, whilst another characteristic of note is the very small number—only ten in the present installation—of rotary switches of the automatic telephone type. The slow-moving electro-mechanical action of the receiver makes its operation easily intelligible to the eye. It is interesting to note that the whole of the transmissions and receptions of the descriptions of the very heavy traffic—not only of varying types but to and from several different places—in and out of Fenchurch Street, is carried throughout over four lines of wire only.

The installation was fixed by the Westinghouse Brake & Signal Company to the instructions of Mr. C. J. Brown, Engineer, Southern Area, L.N.E.R., and to specifications prepared by Mr. F. Downes, Signal and Telegraph Engineer, Southern Area.



Ribbon storage train describer receiver

The Lighting of Fenchurch Street Station

IN connection with the remodelling of Fenchurch Street station, L.N.E.R., described and illustrated in THE RAILWAY GAZETTE of May 10 last, a new electric lighting system has been installed. Its principal feature is the use of Siemens electric discharge lamps and fittings, and, as will be seen in the illustration, the light is effectively distributed, visibility is extremely good, and glare is entirely absent.

Station artificially illuminated. Note distribution of light and good visibility

The installation under the main roof consists of eight Sieray electric discharge lighting units mounted at a height of approximately 20 ft. above platform level. Each unit comprises a Preston-Sieray lantern containing one 250-watt Sieray lamp, type H, and three 75-watt tungsten filament lamps, the latter being arranged at 120-deg. intervals around the discharge lamp. Over the platforms the lanterns are spaced 66 ft. apart with an interval of 40 ft. between the two lines of lanterns. Owing to the intervention of the line of local ticket barrier lights the two lanterns outside the ticket barrier are 77 ft. from the nearest platform lanterns and are 52 ft. apart.

The area lighted is approximately 290 ft. long × 104 ft. wide at platform level, and the height to the bottom of the roof trusses is approximately 40 ft. The total lighting load under the new system is 5·2 kW., which includes sundry points for local lighting at the barriers, &c. The illumination under the new scheme is far superior to that obtained under the old system using Tungsten lamps only, and, as will be seen in the illustration, the whole station has a cheerful aspect, which must be conducive to the comfort of travellers, and also to the efficiency of the staff.

A flood scene in the Thames Valley on the G.W.R. line near Oxford

The new booking office at York, L.N.E.R. (*See paragraph on page 1054 of our December 20 issue*)

Scene of the accident at Parton, near Castle Douglas, to the Stranraer boat train, in which no serious casualties occurred
(*See news paragraph on page 35*)

RAILWAY NEWS SECTION

PERSONAL

G.W.R. Appointments

The directors of the Great Western Railway have approved the following appointments:—

Mr. J. A. Warren-King, Assistant District Goods Manager, Birmingham, to be District Goods Manager, Worcester, vice Mr. E. W. Mauger who is retiring.

Mr. D. Blee, Assistant District Goods Manager, London, to be District Goods Manager, Shrewsbury, vice Mr. W. H. Hall who is retiring.

Mr. D. G. Hoppins, Assistant Docks Manager, Newport, to be Traffic and Marine Agent, Weymouth, vice Mr. P. Boyle who is retiring.

Mr. J. Russell, Chief Clerk, District Goods Manager's office, Bristol, to be Assistant District Goods Manager, Birmingham.

Mr. H. M. Cameron, Chief Clerk, District Goods Manager's office, London, to be Assistant District Goods Manager, London.

Mr. H. G. Kerry, Assistant Divisional Locomotive Superintendent, Cardiff, to be Assistant Divisional Locomotive Superintendent, Old Oak Common.

Mr. H. T. Rendell, Assistant Divisional Locomotive Superintendent, Old Oak Common, to be Assistant to Divisional Locomotive Superintendent, Neath.

Mr. W. H. Bodman, Assistant to Divisional Locomotive Superintendent, Neath, to be Assistant Divisional Locomotive Superintendent, Cardiff.

Mr. W. H. Hall, O.B.E.

District Goods Manager, Shrewsbury, G.W.R., 1927–35

Mr. E. W. Mauger,

District Goods Manager, Worcester, G.W.R., 1928–35

The late Mr. F. T. Bowler, B.Sc.,

Divisional Engineer, Oswestry, G.W.R., 1932–35

Mr. W. H. Hall, who retired at the end of the year from the position of District Goods Manager, Shrewsbury, G.W.R., after 44 years' service, began his railway career at Brettell Lane and for a number of years moved around most of the goods stations in the Birmingham area. In 1911 he was appointed Shed Superintendent at Hockley and three years later Cartage Superintendent at the same depot. During the South African war Mr. Hall served with distinction with the 1st South Staffordshire Regiment, being mentioned in despatches and recommended on the field for a commission. At the outbreak of the European war he was gazetted to the Royal Engineers, Transport Establishment, and rose to the rank of Lt.-Colonel. He was mentioned in despatches on three occasions and among the decorations he received were the Order of the British Empire (Military) and the Ordre de Leopold II. On his return to the G.W.R. he successively occupied the posts of Goods Agent at Tyseley, West Bromwich and Hockley, and in 1925 he was appointed Assistant District Goods Manager, Birmingham. Two years later he was promoted to the managership at Shrewsbury, which post he has just vacated on his retirement.

Mr. E. W. Mauger, who retired from the position of District Goods Manager, Worcester, G.W.R., at the end of the year, entered the company's service in 1891 in Guernsey. In 1907 he was transferred to the office of the Superintendent of the Line and was actively associated with Continental matters. In 1910, after representing the company at the Brussels Exhibition, he was appointed Agent at Nantes, and later was transferred to the London District Goods Manager's office. He returned to the Continent in 1914 as the company's Agent, but in the following year joined the Railway Operating Division, and saw service overseas, being demobilised in 1919 with the rank of Major. He was then appointed to the Goods Agency at Cardiff and in 1920 went in a similar capacity to Birmingham where, two years later, he became Assistant District Goods Manager. In 1924 he was appointed to the post of Irish Traffic Manager and since 1928 has been at Worcester as District Goods Manager, the position from which he has just retired.

We regret to record the death, on December 26, of Mr. F. T. Bowler, B.Sc. (London), Divisional Engineer, Oswestry, G.W.R., after a brief illness. Mr. Bowler served from 1899 to 1902 as a pupil under the late Mr. W. Sutcliffe Marsh, M.Inst.C.E., on new works in the Swansea area, but in September, 1902, he joined the Great Western Railway and was appointed to the office of the Divisional Engineer, Neath, where he remained until 1907. He was then transferred to the Chief Engineer's permanent way office at Reading, there specialising in permanent way design, manufacture and practice. In 1911 he was promoted Assistant. Mr. Bowler was responsible

for the design and layout of many fast-running junctions, such as Aynho, Ashendon and Newport Tunnel West. In 1923 he was appointed Assistant Divisional Engineer, Paddington, the post he held until July, 1932, when he was promoted to take charge of the Central Wales Division, with headquarters at Oswestry. Mr. Bowler held a commission in the Royal Engineers during the war, serving in both France and Belgium. On the formation of the Supplementary Reserve of Royal Engineers Transportation Troops, he

Mr. J. A. Warren-King,
Appointed District Goods Manager, Worcester, G.W.R.

raised, and was given command of, the Construction Company, composed of Great Western Railway employees. In this connection he was awarded Brevet Lieut. Colonel's rank in the Supplementary Reserve, in the 1932 New Year Honours list, and last May was gazetted Major and Brev. Lt.-Col. in the Regular Army Reserve of Officers, Regimental List, Royal Engineers. Mr. Bowler, who was an A.M.Inst.C.E., wrote a number of articles upon permanent way matters.

The funeral took place at Oystermouth Cemetery, Swansea, on December 30. Among those, other than relatives, present were: Messrs. R. Carpmael, A. S. Quartermaine, R. C. Kirkpatrick, H. A. Alexander, S. A. Blackall, A. W. Hollingdale, J. E. S. Griffith, F. J. Tyley, M. C. Harrison, T. R. Dovell, M. A. Henry, C. H. T. Morgan, S. G. Vowles (representing Mr. F. R. E. Davis), I. David, and F. Eynon. Also Capt. P. D. G. Buchanan, R.E. (representing the Commandant and Officers of the R.E., Longmoor), Major S. E. Tyrwhitt, R.E. (S.R.) (representing the 154th (G.W.) Operating Company, R.E., (S.R.), Capt, R. H. Edwards, R.E. (S.R.) (representing the 151st and 152nd (G.W.) Construction Companies, R.E., (S.R.), Capt. Bevan, and Mr. William Evans.

Mr. J. A. Warren-King, who has been appointed District Goods Manager, Worcester, G.W.R., joined that railway in 1902, and was attached to the General Manager's office. After gaining experience in most sections and taking charge of the statistical and general sections, he went to France as an R.T.O. in April, 1915, and was demobilised in February, 1920, with the rank of Major. In March, 1924, Mr. Warren-King was attached to the Royal Commission which visited and reported upon the New South Wales and New Zealand Government Railways, and at the request of the N.Z. Minister of Railways, remained in that country an additional three months to introduce up-to-date statistical methods upon the N.Z.G.R. Then in March, 1927, he went to Nyasaland with the Royal Commission that reported upon lines of communications and the possibilities of a bridge over the Zambesi. In December, 1928, Mr. Warren-King was appointed Assistant and Chief Clerk to the London District Goods Manager, G.W.R., and in May, 1931, became Goods Superintendent at Hockley, Birmingham. In October last he was promoted to be Assistant District Goods Manager Birmingham, the position he now relinquishes to become District Goods Manager, Worcester.

Mr. W. E. Blakesley, who, as announced in THE RAILWAY GAZETTE of December 13, has been appointed District Locomotive Superintendent, Crewe, L.M.S.R., entered the service of the London & North Western Railway at Northampton in 1905. After serving his apprenticeship he worked as a fitter at Northampton, Nuneaton and Willesden, and as Fitter-in-Charge at Doncaster: in 1918 he was appointed Assistant Foreman-in-Charge of the Rhyl shed. In the following year he took charge at Oxenholme and in 1920 was transferred to Carnforth. Five years later he became Running Shed Foreman of the Carnforth depots, and in June, 1928, was appointed District Locomotive Superintendent at Carnforth. In November, 1930, Mr. Blakesley was transferred to Preston in a similar capacity. It was in January, 1934, that he became District Locomotive Superintendent, Bescot, which includes charge of Aston and Monument Lane, the position he now vacates to take over charge of the important Crewe locomotive district.

Mr. J. B. Dunkley, who, as announced in THE RAILWAY GAZETTE of December 13 last, has been appointed Stationmaster, St. Pancras, L.M.S.R., was born at Northampton in 1891, and entered the Goods Department of the former L.N.W.R. there at the age of 14. After nine years in that department at various stations in the Northampton and Rugby districts, he was transferred to the Traffic Department as Stationmaster at Hammerwich (Staffs), in August, 1914. In November of that year he was appointed District Relief Clerk at Birmingham, which position—excluding his period in the Army—he held until December, 1920. On January 1, 1921, Mr. Dunkley was appointed District Check Clerk for the Birmingham District, and in February, 1922, was transferred to the District Superintendent's Staff office at New Street. Following the amalgamation, he was transferred to the Chief General Superintendent's Office at Derby, and on November 1, 1925, was appointed Head Office Inspector (Staff),

Mr. J. B. Dunkley,
Appointed Stationmaster, St. Pancras, L.M.S.R.

Chief General Superintendent's Office, Derby, which position he held until November, 1934, when he was transferred to a similar position at Euston. Mr. Dunkley now vacates this appointment to go to St. Pancras as Stationmaster.

Mr. E. F. Tremayne, Deputy Secretary and Registrar in London, Canadian Pacific Railway, has retired at the end of 1935, after 52 years' service with the company. Mr. F. J. Whiddett has been appointed to succeed him.

Mr. G. E. Chittenden, until recently Director, Publicity and Travel Bureau, South African Railways and Harbours, South Africa House, London, has now been appointed Assistant Catering Manager, South African Railways.

Mr. F. E. M. Beatley, General Manager and Traffic Manager, Sierra Leone Government Railways, has arrived in Great Britain on leave.

Mr. S. R. Beale has been appointed Chairman of Guest, Keen & Nettlefolds, Limited, in succession to the late Sir J. F. Beale. Mr. T. S. Peacock, Deputy Chairman, was obliged to decline the chairmanship owing to ill-health.

NEW YEAR HONOURS

Privy Councillor

Nawab Sir Muhammad Akbar Nazar Ali Hydari, Kt., LL.D., Finance and Railway Member of the Executive Council of Hyderabad State, and President of the Board of Directors, His Exalted Highness the Nizam's State Railway.

Knight Commander of the Victorian Order

Sir James Milne, Kt., C.S.I., General Manager, Great Western Railway.

Knights Bachelor

Mr. Ralph Cope, Chief Accountant, Great Western Railway.

Mr. William Rutton Searle Sharpe, lately Chairman, Bombay Port Trust.

Mr. Lionel Ashton Piers Warner, C.B.E., J.P., General Manager and Secretary, Mersey Docks and Harbour Board.

C.B.

Mr. Alfred Theodore Vaughan Robinson, C.B.E., Deputy Secretary, Ministry of Transport.

C.I.E.

Mr. William Edward Gustave Bender, M.B.E., V.D., M.Inst.C.E., A.C.G.I., Chief Engineer, Bengal & North Western and Rohilkund & Kumaon Railways, India.

Mr. James Cairns, O.B.E., Chief Medical and Health Officer, North Western Railway, India.

Mr. Alfred Axen Leonard Flynn, V.D., Traffic Manager, Karachi Port Trust, India.

Mr. James William Gordon, O.B.E., Manager, Jodhpur (State) Railway, India.

C.B.E.

Mr. Francis Robert Edward Davis, O.B.E., Secretary, Great Western Railway.

Mr. Spencer Pelham Flowerdew, Executive Engineer in charge of the northern extension of the Nyasaland Railways.

Mr. Leslie Mason Smart, General Manager and Harbour Authority, Gold Coast Government Railway and Takoradi Harbour.

O.B.E.

Mr. John Frederick Lean, Principal Assistant to the General Manager, Great Western Railway.

Mr. Libert Oury, Director of the Nyasaland, the Central Africa and the Beira Railways, for services connected with the Zambesi Bridge.

M.B.E.

Mr. Mohamed Allam, Clerk, Kenya and Uganda Railways and Harbours.

Mr. Terrence John Carroll, Honorary Assistant Engineer (retired), Burma Railways.

Khan Bahadur Dadabhoy Nadirshaw, Personal Assistant to the Member of the Governor-General's Executive Council (India) in charge of Railways and Commerce.

Mr. Frederick Charles Sheldon, Senior Locomotive Running Inspector, Great Western Railway.

Mr. Ernest John Sutton, Staff Officer, Ministry of Transport.

B.E. Medal

Mr. William Enoch Butland, Bridge Inspector, Plymouth, G.W.R.

Mr. Edward Hurley, Guard, G.W.R.

Mr. Ralph Cope,

Chief Accountant, Great Western Railway, who is to receive the honour of Knighthood

Mr. Wallace Reginald Morris, District Goods Inspector, Birmingham, G.W.R.

Mr. Ralph Cope, who is to receive the honour of knighthood, has spent his whole career in the Chief Accountant's office of the Great Western Railway, starting work as a clerk in January, 1877. He worked successively in practically every section of that department, becoming Chief Clerk in 1910. In 1912 he received an expression of appreciation from the board of directors for valuable services rendered in connection with the re-organisation of the Hotels and Refreshment Rooms Department accounts, and was subsequently appointed Principal Assistant to the Chief Accountant. In July, 1916, he succeeded the late Mr. G. J. Whitelaw as Chief Accountant. During the 19½ years that have since elapsed, he has had the responsibility, so far as the Great Western is concerned, of the accounting work involved by the Government control during the war period and the compensation and handing back of the railways in 1921. Then followed the grouping and the absorption of the various constituent and subsidiary companies consequent on the Railways Act of 1921. Subsequently there have been the various wage adjustments, the giving of evidence before the Railway Rates Tribunal in the protracted "standard revenue" proceedings and at subsequent annual revisions of railway charges, and before the Rates Advisory Committee in connection with dock charges. More recently there has been the heavy accountancy work involved in the preparation of the pooling schemes with the L.M.S.R. and L.N.E.R. and the London Passenger Transport Board. Mr. Cope has been Chairman of the Railway Accountants' Conference since 1923.

Argentine Retirements

We are officially informed that Mr. Robin Stuart, Commercial General Manager, and Mr. C. A. Roberts, Technical General Manager, Buenos Ayres Great Southern and Buenos Ayres Western Railways, are retiring in March.

Mr. H. B. Webster, Assistant (Rates and Charges) to the Chief Commercial Manager, L.M.S.R., has been re-elected Chairman of the Irish and English Goods Traffic Conference for 1936.

Mr. G. F. Thurston

On December 19, Mr. G. F. Thurston, Divisional General Manager, Southern Area, L.N.E.R., was entertained to luncheon at Liverpool Street by members of the Officers' Mess, who took the opportunity to present him with a walnut writing desk, also a gold and amethyst brooch for Mrs. Thurston. Those present expressed their great regret at his impending retirement, and their appreciation of the courtesy and consideration they had at all times received at his hands. Mr. Thurston in replying expressed his grateful thanks for the loyal co-operation and assistance he had always received from officers of the Southern Area, and stated that, in severing business relations with them, it afforded him the keenest satisfaction to know that he carried with him into retirement their friendly regard, and their good wishes for the future happiness of himself and of his family, who would value equally with him the presentation.

The Bournemouth Belle Pullman

Inauguration of daily running

The Southern Railway all-Pullman express, the Bournemouth Belle, will run daily during 1936 between London (Waterloo), Southampton Central, and Bournemouth. The Bournemouth Belle was introduced on July 5, 1931, and up to the present has run daily during the summer holiday periods and on Sundays only during the winter, but it has become so popular with business men and winter holiday-makers travelling to and from the rapidly growing port of Southampton, and the famous "all the year round" resort of Bournemouth, that it has been found that public needs require this service on weekdays as well as Sundays. The train consists of first and third class Pullman cars, luxuriously furnished, and provides hotel facilities.

The Bournemouth Belle leaves Waterloo at 10.30 a.m., arriving at Southampton Central 11.58 a.m., Bournemouth Central 12.38 p.m., and Bournemouth West 12.40 p.m. In the reverse direction the times are as follow:—

	Weekdays	Sundays
	p.m.	p.m.
Bournemouth West dep.	4.35	6. 8
Bournemouth Central dep.	4.45	6.20
Southampton Central dep.	5.25	7. 0
Waterloo ... arr.	6.55	8.30

Cheap monthly return tickets are available daily by this train, on payment of the following Pullman supplements:—

Between	First class	Third class
	s. d.	s. d.
Waterloo and Southampton Central	2 6	1 6
Waterloo and Bournemouth Central or West	3 6	2 0
Southampton Central and Bournemouth Central or West	1 6	1 0

Cheap day return tickets are issued on Sundays only, the fares, *including* Pullman supplement, being:—

Between	First class	Third class
	s. d.	s. d.
Waterloo and Southampton Central	20 0	12 6
Waterloo and Bournemouth Central or West	25 0	15 0

Up to the present time the Bournemouth Belle has carried 149,752 passengers.

On January 1 the Southern Railway and Pullman Companies invited a number of guests and press representatives to take part in the inauguration of the new service. Those present included:—

Alderman H. G. Harris (Mayor of Bournemouth); Mr. Edward Brown (Vice-Chairman, Bournemouth Publicity Committee); Mr. W. Birtwistle (Publicity Manager, Bournemouth); Ald. T. H. Sanders (Mayor, Southampton); Sir Henry Buckland (General Manager, Crystal Palace); Lt. Col. P. M. Brooke-Hitching; Mr. J. A. Kay, Editor, THE RAILWAY GAZETTE; Mr. D. R. Lamb, Editor, *Modern Transport*; Mr. R. Wilton; and Mr. G. N. Reeves.

The Southern Railway was represented by:—

Messrs. E. C. Cox, Traffic Manager; J. B. Elliot, Assistant Traffic Manager; W. J. England, Assistant Superintendent of Operation; S. W. Smart, Assistant for Train Services; A. Brealey, Timetable Department; W. M. Perts, Deputy Commercial Assistant; E. Hight, Southern Divisional Superintendent, Southampton; J. E. Sharpe, London (West) Divisional Superintendent; S. Derry, Assistant for Development of Traffic; C. Grasemann, Public Relations and Advertising Officer; and A. Berriman, Advertising Department.

The Pullman Car Company was represented by:—

Mr. G. H. Griffith, General Manager; and Mr. W. J. Sedcole, Engineer.

Luncheon was served on the downward journey, and during the afternoon the guests were taken on a motor coach tour of the winter attractions and developments at Bournemouth arranged by the Bournemouth Corporation.

Mr. F. C. Cox, Traffic Manager, Southern Railway, replying to appreciative speeches by the Mayors of Bournemouth and Southampton, stated that by their decision to run the Bournemouth Belle daily throughout the year, the Southern Railway and their partners the Pullman Car Company were adding yet further to the travelling facilities between London, Southampton, and Bournemouth, and hoped it would reap the reward the enterprise merited. It provided a new morning service at a convenient time both to Southampton and Bournemouth which he hoped would be appreciated by travellers.

The Bournemouth Belle passing Weybridge. This well-known Southern Railway train is now running daily as from January 1

Locomotive Coal Prices

The main line railway companies, in common with other large consumers of coal, were asked by the coal owners to agree to an increase in the price of coal under existing contracts, with a view to facilitating the negotiations for an increase in mine workers' wages. This request was considered at a special meeting of the Railway Companies' Association, and on December 20 Sir Ralph Wedgwood, Chairman of the Railway General Managers, sent the following reply to Sir Evan Williams, President of the Mining Association of Great Britain:—

DEAR SIR EVAN WILLIAMS,—The question which you put before Sir Josiah Stamp and the General Managers at their meeting with you has now received the very careful consideration of the four main line railway companies. Great sympathy was expressed with the coal trade in the difficult position in which they are now placed, and I should like to assure you that the railway companies feel very genuinely the importance of the issue which you placed before them. We understood from you that you anticipated receiving a favourable reply to your proposals from the gas and electric power industries, as also from various of the general industries who are large consumers of coal. The example which may be set by public utility companies and other large industries naturally weighs very strongly with us, and we should be very glad if circumstances enabled us to take our stand with them in dealing with your proposition.

You are, however, fully familiar, as I know, with the very essential difference in the railway companies' position. In the electric power industry, the coal clause, which forms a feature of nearly all contracts under which power is supplied to consumers, provides an automatic method of passing on to the consumer the increased expenses incurred by a voluntary increase in the price of coal. In the gas industry, arrangements of a somewhat similar character enable the cost ultimately to be transferred to their customers. In the iron and steel industry, which enjoys a large measure of protection, it may be taken as certain that increased prices to the purchaser will compensate the industry for the voluntary addition which they are asked to make to their coal costs. Indeed, some such advances have already taken place in anticipation, one may suppose, of the emergency which has arisen. Similar considerations apply to the other industries which are understood to be prepared to acquiesce in an increase in the price of coal supplied under current contracts.

I need not remind you, however, that the railway companies are in no such position. They have no automatic method of increasing their charges in ratio to an increase in their expenses or of ensuring that a particular burden, such as this, can be specifically covered. They are not sheltered by protection of any kind, and they have a keen competitor in the road transport industry. It follows that, even if the railway companies had a ready means of increasing their charges, such an increase would, over a large section of industry, fail to bring in an increased revenue, and might well result in a reduced revenue. To be effective an increase in railway charges would probably have to be limited to the rates charged for the carriage of coal and of the raw materials and some of the products of the iron and steel and other heavy industries.

The railway companies are unwilling at the present juncture to suggest an increase of rates for this purpose, and any concession made by them in the direction proposed by the coal industry would therefore be a direct reduction of their already meagre net revenues. In this, as I am sure you will admit, they differ from public utility undertakings and other industries. More than that, the railway companies, as consumers of electric power and light, of gas, and of iron and steel products and other materials, will themselves (quite apart from any concession on coal contracts) be called upon to bear a substantial proportion of any voluntary sacrifice which other industries may be looked upon as accepting in the first instance.

We have endeavoured to look at the matter from the most sympathetic point of view, but we feel bound nevertheless to adopt the view that we should not be justified in acceding to the proposal which you have put before us.

Yours very truly,
(Signed) R. L. WEDGWOOD

We refer to this in an editorial note on page 2.—ED., *R.G.*

RATING OF METAL ARC WELDING PLANT AND EQUIPMENT.—The British Standards Institution has issued a specification which standardises the method of rating metal arc welding equipment. The specification is in two sections; the first lays down the rating for welding sets of the non-automatic and automatic type and also of the single and multiple arc type, electric motors, reactors, transformers, and resistances. The second section deals with safety appliances, and lays down requirements for welding accessories such as electrode holders, hand shields, helmets, screens, gloves, aprons and similar equipment. Copies of this new B.S. Specification (No. 638—1935) may be obtained from the British Standards Institution.

SOUTHERN RAILWAY POSTERS.—A very effective poster, advertising electric services from London to South Coast resorts, has lately been issued by the Southern Railway. The artist, Mr. Pat Keely, has chosen a night scene, and focuses the attention upon the "clear" aspect of a colour-light signal, prominent against a dark sky. But for this striking use of green, the poster is in black, deep blue, and white, and gives an impression of a railway line, with the conductor rail given due prominence, following the curve of a bay; the lights of a town are seen in the background across the water. The words "Southern Electric" appear at the foot, and the names of resorts served by the electrified routes in the margin. Two more recent posters emphasise Southern slogans. "The Permanent Way for Permanent Sunshine," signed by "Blun," is a rail-level view of the wheels of a passing train, done in lively colours appropriate to the sentiment it expresses. "Read Between the Lines" is the heading of a poster from the McCorquodale studio, and when the injunction is obeyed, the words "The Way for Ease" are observed between the sleepers of a stretch of permanent way, seen from above. Additional letters outside the rails amplify the foregoing slogan to "Southern Railway Comfort Pleases." As in many recent Southern posters, the engineer has had to give special licence to the artist.

MAKING UP LOST TIME.—Two noteworthy efforts at time recovery on the L.N.E.R. came to our notice during the Christmas holidays. On the first portion of the 5.45 p.m. from King's Cross, No. 2561, *Minoru*, hauling 410 tons, was driven with such vigour as to regain 8¼ min. lost by adverse signals, between Hatfield and Hitchin, and reached Grantham punctually; the net time for the 105·5 miles was 104¾ min., and the run included an average speed of 60 m.p.h. over the 20·6 miles from Werrington junction up to Stoke summit. On the up Flying Scotsman, No. 2552, *Sansovino*, with an even heavier train of 520 tons, ran from Grantham to King's Cross in 104 min. net. Speed averaged 80·6 m.p.h. over the 17·6 miles from Corby to Werrington, while even for the hardest uphill work the maximum cut-off used was 25 per cent.; yet on Stevenage bank, six miles at 1 in 264-200, speed fell only from 66 to 51 m.p.h. In this way no less than seven minutes of lost time were regained on a schedule which, allowing for load hauled and the intervening Peterborough slack, is severe. On the L.M.S.R. a Manchester-Glasgow express parcels train, weighing 224 tons and hauled by one of the latest three-cylinder 4-6-0 express locomotives, passed Carnforth 20 minutes late. So enterprising was the engine crew, however, that Shap summit, 31½ miles further on and 914 ft. above sea level, was passed only seven minutes late, the distance having been covered in approximately 30 minutes, despite the almost continuous rise, 4 miles of which are as steep as 1 in 75.

L.N.E.R. Building Programme, 1936-7

Following its usual practice in reviewing from time to time requirements in regard to the renewal and improvement of locomotives and rolling stock, the L.N.E.R. decided some little time ago to put into force an extensive programme which is to be carried out during the two years 1935/36. The programme provides for the construction of 207 locomotives, 1,154 passenger coaches, 11,046 wagons together with 50 horse boxes, 500 wagons for the haulage of locomotive coal, and 780 containers of the latest types. Certain of these locomotives and other vehicles have already been brought into service. This programme follows the normal process of renewal and is quite independent of any locomotives and passenger vehicles which will be provided by the L.N.E.R. under the terms of the Government Guaranteed Loan.

Amongst the locomotives comprised in the 1935/36 programme are 18 express passenger engines of the latest types. Four of these have already been put in service for working the "Silver Jubilee" and other important trains, and the remaining 14 are of the "Sandringham" 4-6-0 type. There are also 125 powerful locomotives of the 2-6-0 and 0-6-0 types capable of hauling fast freight trains, long distance excursions, and main line passenger trains. There will also be 28 locomotives of a new design for this class of service, and a number of shunting engines and 18 passenger tank engines for suburban services of the latest three-cylinder 2-6-2 design.

The passenger train vehicles include a new train for the Hook and Antwerp Continental boat express from Liverpool Street, 10 sleeping cars, 24 restaurant cars and 9 buffet cars. Tourist train stock will be augmented by 29 new vehicles, while 33 vestibuled vans for the conveyance of parcels traffic on express services, and a number of first and third class vehicles for main line and cross-country services are provided for.

A feature of the construction of freight vehicles is the large number to be fitted with the continuous brake to enable them to be worked on the express freight trains which are such a prominent feature of L.N.E.R. services. 250 covered fish wagons are included in the programme together with special wagons for the conveyance of iron and steel plates, tubes and girders, of which traffic the L.N.E.R. carries a considerable tonnage. Of the 780 containers scheduled for construction, large numbers are specially designed for the purposes of household removals, conveyance of cycles and the transport of meat, in addition to providing further units for general merchandise traffic. For conveying containers, 1,230 flat wagons are being built all of which will be fitted with the continuous brake for service on express freight trains.

Plans have also been completed for the renewal of 466½ miles of track during the coming year. In addition to new ballast, sleepers, chairs, &c., this will require the provision of 66,000 tons of British steel rails. It is also intended to renew 56 bridges during the year and to repaint 354 stations, a large number of which will be redecorated in brighter colours in conformity with the "brighter station" movement initiated by the L.N.E.R. some little time ago.

G.W.R. 1936 Programme

The Great Western Railway 1936 programme of renewals and additions to rolling stock and permanent way, which is quite apart from the works to be carried out under the Government Guaranteed Loan scheme, is the largest to be undertaken by the company for some years past and includes the construction at Swindon of 225 locomotives, 302 passenger coaches, and 3,500 freight wagons.

The locomotives are to be divided as follow:—

- 25 "Castle" class four-cylinder 4-6-0 express passenger engines.
- 10 "Hall" class two-cylinder 4-6-0 passenger engines.
- 100 4-6-0 engines of a new class with two cylinders and 5 ft. 8 in. coupled wheels.
- 80 0-6-0 tank locomotives.
- 10 0-4-2 tank locomotives for auto train working.

The 5 ft. 8 in. 4-6-0 locomotives are to be conversions, by the fitting of larger boilers and leading four-wheel bogies, of existing 2-6-0's. (*See editorial note on page* 3).

Of the passenger coaches 172 will be of somewhat similar design to the new Cornish Riviera stock. They will have end vestibules, deep seats, modern upholstery, large observation windows and improved ventilation. A further ten coaches of the centre-vestibule type, designed specially for catering for pleasure parties, will be built, while a new feature will be the construction of two coaches providing accommodation for third-class passengers at one end and a modern cafeteria with stand-up seats at the other. The various types and numbers of each to be built are as follow:—

- 40 First-third-brake non-corridor composite coaches.
- 40 Third class non-corridor coaches.
- 16 First and third corridor coaches.
- 20 Third-brake non-corridor composite coaches.
- 20 First-third brake corridor composite coaches.
- 68 Third class corridor coaches.
- 56 Third-brake corridor composite coaches.
- 10 Centre-vestibuled third-class coaches.

Two third class and cafeteria coaches.

30 Passenger brake vans.

The G.W.R. already operates the highest proportion of completely fitted vacuum-brake freight stock in the country, and the 1936 wagon programme provides for the addition of a further 1,250 vehicles of this type as follow:—

- 2,100 Open 12-ton non-vacuum-fitted wagons.
- 500 Special wagons vacuum-fitted for container traffic.
- 750 Covered 12-ton vacuum-fitted wagons.
- 50 20-ton goods guards' brake vans.
- 100 20-ton rail and timber wagons.

Some 406 miles of line are to be completely relayed or partly renewed in addition to the general maintenance of stations, works, and structures, and the reconstruction, wholly, or in part, of some 50 bridges.

Exports of Railway Material from the United Kingdom in November

	Nov., 1935	Nov., 1934	Eleven Months Ending Nov., 1935	Eleven Months Ending Nov., 1934
	£	£	£	£
Locomotives, rail	46,932	107,733	688,424	340,615
Carriages and wagons	171,146	107,141	1,155,431	824,760
Rails, steel	103,084	73,888	846,421	965,708
Wheels, sleepers, fishplates and miscellaneous materials	160,544	108,252	1,745,239	1,097,350

Locomotive and rail exports included the following:—

	Locomotives		Rails	
	Nov., 1935	Nov., 1934	Nov., 1935	Nov., 1934
	£	£	£	£
Argentina	—	—	9,394	7,066
Union of South Africa	—	—	111,059	45,588
British India	—	—	36,755	32,017

NOTES AND NEWS

New Station in North Kent.—A new station, named Falconwood, was opened on January 1, between Eltham Park and Welling, on the Bexley Heath line of the Southern Railway.

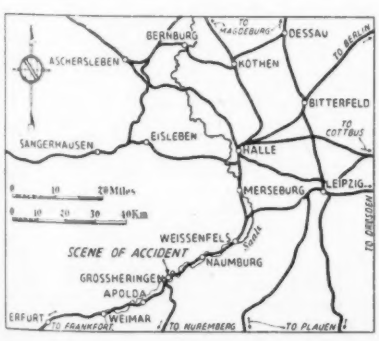
G.W.R. Stations Renamed.—The following two G.W.R. stations near Birmingham have been renamed: Langley Green & Rood End is now Oldbury and Langley Green; and Princes End is Princes End and Coseley.

British Industries Fair.—The Board of Trade British Industries Fair will be held from February 17 to 28 next; London sections will be at Olympia and White City and the Engineering and Hardware section will be arranged at Birmingham.

G.W.R. West of England Line Diversion.—The subsidence of a bridge carrying the Devizes-Salisbury road across the G.W.R. main line west of Patney and Chirton station necessitated the diversion of all services to alternative routes on Wednesday, January 1. By the evening, the bridge had sunk to 3 ft. below its normal level.

Great Southern Railways of Ireland.—An extraordinary general meeting of the proprietors of the Great Southern Railways Company will be held at 2 p.m., on January 10, 1936, at the Gresham Hotel, Dublin, to consider a resolution empowering the directors to create at their discretion £637,892 debenture stock, which may be redeemable or irredeemable, and bear such rates of interest as the directors may determine.

German Railway Accident.—On Christmas Eve, as the 3.57 p.m. express (D train) from Berlin to Frankfort and Basle was approaching Gross Heringen, the junction between Frankfort and Nuremberg main lines, 115 miles from Berlin, it collided with the rear portion of a local train which had just left the station for Leipzig. The local train was crossing the path of the express on the railway bridge spanning the River Saale and the last eight coaches were badly smashed. 33 persons in these coaches lost their lives and 27 were seriously injured. Some of the victims and wreckage fell into the river. The express was drawn by two locomotives and, consisting of up-to-date stock, presumably of all-steel construction, suffered little damage and none of its passengers was seriously hurt. While the cause of the accident has not been made known it is suggested that the express overran its signals.



Wages Restoration Claim.—A conference has been arranged for Tuesday, January 7, between representatives of the four main line railways and the railway trade unions to discuss further the restoration of the balance of the cut in wages and of working conditions.

London Transport Fish Traffic.—The carriage of fish on the London Passenger Transport Board's trains was discontinued as from Wednesday, January 1. This has been made necessary by the abolition of parcel accommodation in Inner Circle trains to provide more room for passengers; there have also been a number of complaints from passengers at Monument station.

Official Opening of New Nerbudda Bridge.—On December 20, Lord Brabourne, Governor of Bombay, opened the Silver Jubilee Bridge over the Nerbudda River on the Bombay Baroda & Central India Railway main line. The new bridge replaces an old structure that crosses the river near Broach, 200 miles north of Bombay, and is not up to modern loads. It is 4,500 ft. in length and was completed over a year ahead of contract time.

Improved Interchange Facilities at Liverpool Street.—To improve the means of communication between the main line and the Central London stations at Liverpool Street, the L.N.E.R., in co-operation with the London Passenger Transport Board, is to construct a new subway between the Central London booking hall and the concourse facing the suburban platforms on the west side of the main line station. The new subway will shorten the distance between the tube and the main line stations and relieve congestion which now takes place in the rush hours.

A Southern Suburban Line Blocked.—Owing to an embankment slip between Eltham-Well Hall, and Kidbrooke on the Bexley Heath line of the Southern Railway last Sunday, the up line subsided to such an extent that traffic on both lines had to be suspended. Quantities of ashes were conveyed to the spot to make good the subsidence, but the line was not reopened to traffic until yesterday morning, when single line working was instituted. During the interruption a modified service was run, down trains from London, except St. Pauls, travelled by the normal route to Blackheath, thence via Woolwich, Slade's Green, Barnehurst, and Bexley Heath to Eltham-Well Hall. Kidbrooke passengers were served by bus. The services to and from St. Pauls were cancelled.

Southern Railway Portsmouth Line Interrupted.—Single line working was necessary between Witley and Haslemere, on the Waterloo-Portsmouth main line, when a subsidence of the embankment on December 31 made it unsafe for trains to run over the down line.

Darlington Forge Limited Reopening.—The English Steel Corporation Limited announces that the works of its subsidiary, the Darlington Forge Limited, will be re-opened in the present year, and that the work necessary to bring the equipment to the state of efficiency prevailing at the corporation's Sheffield works is being put in hand immediately.

French Cable Railway Breakdown.—When a car on the cable suspension railway from Chamonix to Mont Le Brevent jumped its running cable on December 30, forty passengers, including those in the car travelling in the opposite direction, were stranded in mid-air for seven hours. The emergency cable, of course, held the car and obviated any danger.

L.M.S.R. Station Gardens Competition.—Over 300 L.M.S.R. stations in England and Wales competed in the company's 1935 competition for the best kept station gardens. The four chief (special class) prizes have been awarded to: Atherstone (Warwick), Broxton (Cheshire), Charfield (Gloucester), and Walthamstow (Essex). First class "A" prizes have been carried off by Alcester, Blackhorse Road, Bletchley, Knighton, and Morecambe Promenade.

Road Accidents.—The Ministry of Transport return for the weeks ended December 21 and 28 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year:—

	Killed, including deaths resulting from previous accidents		Injured	
England ...	93	(142)	3,559	(3,791)
Wales	3	(7)	144	(143)
Scotland ...	12	(11)	256	(371)
Totals, Dec. 21	108	(160)	3,959	(4,305)
England ...	122	(156)	3,151	(3,365)
Wales	8	(13)	116	(139)
Scotland ...	15	(18)	257	(356)
Totals, Dec. 28	145	(187)	3,524	(3,860)

Accident to Irish Boat Train, L.M.S.R.—In the early morning of December 30 the Stranraer-Larne boat express conveying through coaches from Euston and drawn by two locomotives was derailed between Parton and New Galloway, at a point just beyond the bridge carrying the railway over the River Dee where there is a left-hand curve. The line is single here, and although the derailed locomotives remained on the embankment the coach fell over to the right-hand side, as indicated in our picture on page 28. Fortunately there were no serious casualties.

NEW YEAR MESSAGES

Sir JAMES MILNE, General Manager, Great Western Railway

I should like to extend my cordial greetings and best wishes for a happy and prosperous New Year to every member of the company's staff.

LORD ASHFIELD, Chairman, London Passenger Transport Board

To all members of the Staff: I send my best wishes to you and to the members of your family for a Merry Christmas and a happy and prosperous New Year. I also send my sincere thanks for your help and co-operation in our responsible task of serving the people of London.

Sir JOSIAH STAMP, Chairman and President of the Executive, London Midland & Scottish Railway

It gives me great pleasure to convey, through the *L.M.S. Magazine*, my best wishes for the New Year to all ranks of the staff. Readers of this magazine will have taken a keen interest in the traffic returns which are published monthly, and they will be gratified to have seen that, whilst progress has been slow, the traffic receipts for the year show a definite improvement over 1934. The increase is not as great as we would have wished, but many of the factors influencing this result are not within our own control.

Notwithstanding the difficulties which beset us, I believe that all members of the staff are doing their utmost to maintain the reputation for efficient service which our company has earned, and that they are determined not to lose any opportunity to improve our records still further. Every endeavour has been made through the pages of this magazine and in the two publications *On Time* and *Quota News*, to inform the staff of the means which are being adopted to increase the company's business and make the service we give to our customers still more attractive, and I know I can rely on the staff to see that these services are improved as far as possible by even greater attention to detail, to their needs, and by the "personal touch."

I take this opportunity of thanking you for the excellent work which has been done during the past twelve months.

Mr. C. H. NEWTON, Divisional General Manager, Southern Area, London & North Eastern Railway*

The advent of a new year, welcomed by all as a good opportunity for making new resolutions, provides a fitting occasion to review the events of the preceding year, so that we may profit from the consideration of our experiences. In looking back over the events in the railway world it may be claimed with assurance that the past year has been one of such marked and outstanding progress in railway history, that all engaged in railway undertakings may be rightly proud. Most noteworthy of railway achievements has been the remarkable records set up for steam traction by the L.N.E.R. streamline train, the Silver Jubilee, which in its trial run last September attained a maximum speed of 112 m.p.h., and broke no fewer than four world records. In its scheduled runs, five days per week, between Newcastle and London, accomplished in four hours in each direction at an average overall speed of 67·08 m.p.h., this wonderful train has established a reputation for a combination of speed, punctuality and comfort of a standard hitherto unapproached and which will be difficult to excel. The continued heavy bookings for this train have amply justified the experiment of running it, and have demonstrated that the public is ready and willing to pay a supplementary fare for rapid and comfortable travel. The records of the Silver Jubilee, by attracting extraordinary and world-wide attention, have certainly enhanced the prestige of our railway.

Another important event has been the loan of £35,000,000 which, with Government assistance, was raised last June for the electrification of suburban lines, and many other important improvements and extensions in the London Transport Area. These works (in which the L.N.E.R. shares), when completed, will enable a marked change for the better to be effected in travel facilities in and around London, with greater comfort to the multitudes who journey to and from the Metropolis. A further loan of £26,500,000 for development works on the systems of the four main line railways is about to be launched under Government auspices, and here again the L.N.E.R. is a participant in the scheme. These loans will not only enable modernisation and improvement to be effected in railway equipment and operation, but will provide employment for a number of years for a large body of men. What have come to be known, unfortunately, as the "distressed areas" will greatly benefit by this expenditure. Although it is estimated that the whole programme of works will take not less than five years to complete, the year 1936 will undoubtedly see the execution of its shares of work under these proposals. Great schemes for betterment, such as these, and the steady improvement in industrial activity, give all the indications to justify an optimistic outlook for our railways.

* Following the custom of the L.N.E.R., New Year messages are given in turn year by year in the *London and North Eastern Railway Magazine* by the various chief officers. This is the first from Mr. Newton, who has been appointed Divisional General Manager (Southern Area) as from January 1

British and Irish Railways Stocks and Shares

Stocks	Highest 1934	Lowest 1934	Prices Dec. 31, 1935	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	66½	48½	50	−½
5% Con. Prefce. ...	118	109	118½	—
5% Red. Pref. (1950)	115	107	110½	—
4% Deb.	117	105	112*	—
4½% Deb. ...	119	109	113½*	—
4½% Deb. ...	129½	115¼	122½*	—
5% Deb.	135	126¼	134½*	—
2½% Deb.... ...	75	64	73*	+1
5% Rt. Charge ...	134 7/16	123¼	133½*	—
5% Cons. Guar. ...	132 5/4	121 5/4	132½	—
L.M.S.R.				
Ord.	30½	19½	18	—
4% Prefce. (1923)	64¼	41	54½	+1½
4% Prefce. ...	87	69½	83	—
5% Red. Pref. (1955)	107	92½	103½	—
4% Deb.	114 1/8	100½	108	+½
5% Red. Deb. (1952)	118 11/16	111¼	116½	+1
4% Guar.... ...	106½	96¾	103	—
L.N.E.R.				
5% Pref. Ord. ...	24¾	13½	10	—
Def. Ord.	11½	6 7/8	5 5/4	—
4% First Prefce....	76	59½	57	−1
4% Second Prefce.	47	25½	20	—
5% Red. Pref. (1955)	94½	80	79½	—
4% First Guar. ...	104	92	99½	−½
4% Second Guar.	97 7/8	86½	92	—
3% Deb.	90	74½	82	—
4% Deb.	114	99¼	107	—
5% Red. Deb. (1947)	117	108	114½	—
4½% Sinking Fund Red. Deb.	111¼	105¼	109	—
SOUTHERN				
Pref. Ord.... ...	90	63 1/8	83	—
Def. Ord. ...	32 5/8	19	21	−½
5% Prefce. ...	118 3/16	107½	118½	—
5% Red. Pref. (1964)	115¾	107½	114½	+1
5% Guar. Prefce.	132	120¾	133½	—
5% Red. Guar. Pref. (1957)	119½	113	116½	—
4% Deb.... ...	116½	103¼	112	—
5% Deb.	134	124 15/16	133½	—
4% Red. Deb. 1962–67	113 11/16	105 9/16	112½	+1
BELFAST & C.D.				
Ord.	6	5	9	—
FORTH BRIDGE				
4% Deb.	110	100	103½*	—
4% Guar. ...	110	100	103½*	—
G. NORTHERN (IRELAND)				
Ord.	9 5/4	4 15/16	17	—
G. SOUTHERN (IRELAND)				
Ord.	25	12½	40½	—
Prefce.	21½	13 15/16	47	−2½
Guar.	48	39	88½	—
Deb.	67	59	85¼	−½
L.P.T.B.				
4½% "A" ...	126	115	122½	—
5% "A" ...	135½	124½	134½	+1
4½% "T.F.A." ...	113½	107½	109½	—
5% "B" ...	131¾	118	127½	−1
"C"	97	73	108	—
MERSEY				
Ord.	15¼	7	22	—
4% Perp. Deb. ...	93½	82½	97½	—
3% Perp. Deb. ...	66½	61½	76	
3% Perp. Prefce.	54	44½	62½	+2

* ex dividend

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 51st Week			Totals to Date		
	1935	1934	Inc. or Dec.	1935	1934	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,923 mls.)						
Passenger-train traffic...	540,000	634,000	– 94,000	24,544,000	24,273,000	+ 271,000
Merchandise, &c. ...	493,000	446,000	+ 47,000	23,186,000	22,887,000	+ 299,000
Coal and coke ...	302,000	299,000	+ 3,000	12,013,000	11,829,000	+ 184,000
Goods-train traffic ...	795,000	745,000	+ 50,000	35,199,000	34,716,000	+ 483,000
Total receipts	1,335,000	1,379,000	– 44,000	59,743,000	58,989,000	+ 754,000
L.N.E.R. (6,336 mls.)						
Passenger-train traffic...	353,000	396,000	– 43,000	16,078,000	15,811,000	+ 267,000
Merchandise, &c. ...	347,000	332,000	+ 15,000	16,172,000	16,201,000	– 29,000
Coal and coke ...	280,000	273,000	+ 7,000	11,626,000	11,730,000	– 104,000
Goods-train traffic ...	627,000	605,000	+ 22,000	27,798,000	27,931,000	– 133,000
Total receipts	980,000	1,001,000	– 21,000	43,876,000	43,742,000	+ 134,000
G.W.R. (3,749¼ mls.)						
Passenger-train traffic...	239,000	288,000	– 49,000	10,411,000	10,352,000	+ 59,000
Merchandise, &c. ...	188,000	176,000	+ 12,000	9,319,000	9,204,000	+ 115,000
Coal and coke ...	123,000	110,000	+ 13,000	5,146,000	5,117,000	+ 29,000
Goods-train traffic ...	311,000	286,000	+ 25,000	14,465,000	14,321,000	+ 144,000
Total receipts	550,000	574,000	– 24,000	24,876,000	24,673,000	+ 203,000
S.R. (2,154 mls.)						
Passenger-train traffic...	320,000	370,000	– 50,000	15,196,000	14,852,000	+ 344,000
Merchandise, &c. ...	60,000	59,000	+ 1,000	3,122,500	3,301,000	– 178,500
Coal and coke ...	42,000	37,000	+ 5,000	1,549,500	1,582,000	– 32,500
Goods-train traffic ...	102,000	96,000	+ 6,000	4,672,000	4,883,000	– 211,000
Total receipts	422,000	466,000	– 44,000	19,868,000	19,735,000	+ 133,000
Liverpool Overhead ... (6½ mls.)	1,195	1,146	+ 49	60,012	57,957	+ 2,055
Mersey (4½ mls.) ...	4,895	4,645	+ 250	206,785	208,856	– 2,071
*London Passenger Transport Board ...	582,100	587,500	– 5,400	13,657,400	13,445,800	+ 211,600
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,845	1,904	– 59	126,708	125,479	+ 1,229
,, ,, goods	588	623	– 35	26,316	26,633	– 317
,, ,, total	2,433	2,527	– 94	153,024	152,112	+ 912
Great Northern pass. (543 mls.)	10,150	10,950	– 800	531,200	507,450	+ 23,750
,, ,, goods	11,200	9,350	+ 1,850	483,650	449,550	+ 34,100
,, ,, total	21,350	20,300	+ 1,050	1,014,850	957,000	+ 57,850
Great Southern pass. (2,124 mls.)	26,861	29,213	– 2,352	1,245,484	1,220,267	+ 25,217
,, ,, goods	48,119	44,167	+ 3,952	1,868,211	1,742,463	+ 125,748
,, ,, total	74,980	73,380	+ 1,600	3,113,695	2,962,730	+ 150,965

* 25th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year ; last year's figures are, however, adjusted for comparative purposes

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 52nd Week			Totals to Date		
	1935	1934	Inc. or Dec.	1935	1934	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,923 mls.)						
Passenger-train traffic...	496,000	395,000	+ 101,000	25,040,000	24,668,000	+ 372,000
Merchandise, &c. ...	252,000	240,000	+ 12,000	23,438,000	23,127,000	+ 311,000
Coal and coke ...	192,000	168,000	+ 24,000	12,205,000	11,997,000	+ 208,000
Goods-train traffic ...	444,000	408,000	+ 36,000	35,643,000	35,124,000	+ 519,000
Total receipts	940,000	803,000	+ 137,000	60,683,000	59,792,000	+ 891,000
L.N.E.R. (6,336 mls.)						
Passenger-train traffic...	333,000	290,000	+ 43,000	16,411,000	16,101,000	+ 310,000
Merchandise, &c. ...	209,000	199,000	+ 10,000	16,381,000	16,400,000	– 19,000
Coal and coke ...	183,000	172,000	+ 11,000	11,809,000	11,902,000	– 93,000
Goods-train traffic ...	392,000	371,000	+ 21,000	28,190,000	28,302,000	– 112,000
Total receipts	725,000	661,000	+ 64,000	44,601,000	44,403,000	+ 198,000
G.W.R. (3,749¼ mls.)						
Passenger-train traffic...	238,000	190,000	+ 48,000	10,649,000	10,542,000	+ 107,000
Merchandise, &c. ...	81,000	73,000	+ 8,000	9,400,000	9,277,000	+ 123,000
Coal and coke ...	72,000	57,000	+ 15,000	5,218,000	5,174,000	+ 44,000
Goods-train traffic ...	153,000	130,000	+ 23,000	14,618,000	14,451,000	+ 167,000
Total receipts	391,000	320,000	+ 71,000	25,267,000	24,993,000	+ 274,000
S.R. (2,154 mls.)						
Passenger-train traffic...	317,000	266,000	+ 51,000	15,513,000	15,118,000	+ 395,000
Merchandise, &c. ...	32,000	32,000	—	3,154,500	3,333,000	– 178,500
Coal and coke ...	29,000	25,000	+ 4,000	1,578,500	1,607,000	– 28,500
Goods-train traffic ...	61,000	57,000	+ 4,000	4,733,000	4,940,000	– 207,000
Total receipts	378,000	323,000	+ 55,000	20,246,000	20,058,000	+ 188,000
Liverpool Overhead ... (6½ mls.)	942	856	+ 86	60,954	58,813	+ 2,141
Mersey (4½ mls.) ...	4,169	3,843	+ 326	210,954	212,699	– 1,745
*London Passenger Transport Board ...	488,700	496,200	– 7,500	14,146,100	13,942,000	+ 204,100
IRELAND						
Belfast & C.D. pass. (80 mls.)	2,212	2,143	+ 69	128,920	127,622	+ 1,298
,, ,, goods	229	332	– 103	26,545	26,965	– 420
,, ,, total	2,441	2,475	– 34	155,465	154,587	+ 878
Great Northern pass. (543 mls.)	14,450	13,181	+ 1,269	545,650	520,631	+ 25,019
,, ,, goods	5,600	4,407	+ 1,193	489,250	453,957	+ 35,293
,, ,, total	20,050	17,588	+ 2,462	1,034,900	974,588	+ 60,312
Great Southern pass. (2,124 mls.)	31,235	27,691	+ 3,544	1,276,719	1,247,958	+ 28,761
,, ,, goods	18,232	20,756	– 2,524	1,886,443	1,763,219	+ 123,224
,, ,, total	49,467	48,447	– 1,020	3,163,162	3,011,177	+ 151,985

* 26th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period for last year ; last year's figures are, however, adjusted for comparative purposes

CONTRACTS AND TENDERS

Large L.M.S. and L.N.E.R. Orders under Government Guaranteed Loan

As soon as the Railways (Agreement) Act authorising a Government Guaranteed Loan to the railways of this country for reconstruction and improvement works received the Royal Assent on December 20, the L.M.S.R. and L.N.E.R. announced the placing of contracts respectively for 369 steam locomotives and 270 passenger coaches and 10 steam locomotives and 24 passenger coaches. Further particulars concerning the L.M.S.R. locomotive orders are also contained in a separate illustrated article in this issue.

The L.M.S.R. has placed orders under the Government Guaranteed Loan authorised by the Railways (Agreement) Act, for a total of 369 steam locomotives and 270 passenger coaches, to a total value of £2,800,000, and allocated as follow :—

LOCOMOTIVES—

Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd. : 227 two-cylinder mixed traffic 4-6-0 engines.

Vulcan Foundry Limited : 69 two-cylinder 2-8-0 freight engines.

North British Locomotive Co. Ltd. : 73 two-cylinder passenger 2-6-4 tank engines.

COACHES—

Metropolitan-Cammell Carriage & Wagon Co. Ltd. : 100 vestibuled third coaches.

Birmingham Railway Carriage & Wagon Co. Ltd. : 100 vestibuled third coaches.

R. Y. Pickering & Co. Ltd. : 50 vestibuled third-brake coaches.

Gloucester Railway Carriage & Wagon Co. Ltd. : 20 kitchen cars.

Further details of the locomotives will be found in a separate article published on page 20 of this issue.

The L.N.E.R. has placed orders under the Government Guaranteed Loan authorised by the Railways (Agreement) Act, for ten locomotives and 24 coaches, to a total value of £130,000 and allocated as follow :—

LOCOMOTIVES—

Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd. : 10 three-cylinder 2-6-0 locomotives.

COACHES—

Metropolitan-Cammell Carriage & Wagon Co. Ltd. : 16 vestibuled open-third coaches.

Birmingham Railway Carriage & Wagon Co. Ltd. : eight vestibuled open-third coaches.

So far as the L.M.S.R. orders are concerned, apart from the additional employment caused by the construction of these locomotives and coaches, the work will involve the use of some 40,000 tons of steel and 5,000 tons of non-ferrous metal, which will provide additional employment in the production of the raw and semi-manufactured materials required. All the new L.M.S.R. locomotives will be of the two-cylinder type; the mixed-traffic engines will be designed for the working of both express passenger and freight trains; the 2-8-0 freight tender engines will be used for the working of through mineral trains, while the 2-6-4 passenger tank locomotives will be used for suburban services. The L.M.S.R. passenger coaches will provide additional sets of corridor trains with dining car accommodation for third class excursion services.

G.W.R. 1936 Programme

The G.W.R. has announced a programme of renewals and additions to rolling stock and permanent way for 1936, which includes construction at Swindon of 225 locomotives, 302 coaches and 3,500 freight wagons and is quite apart from the Government Guaranteed Loan scheme. Details of the programme are set out in our news section this week.

L.N.E.R. Building and Renewal Programme, 1936-7

The L.N.E.R. announces a programme of building and renewals, to be spread over the next two years, 1936-7, and to include the provision of 207 locomotives, 1,154 passenger coaches, 11,546 wagons, 50 horse boxes and 780 containers. Certain of these locomotives and other vehicles have already entered service. Details of the programme are set out on another page of this issue, and it will be seen that the items cover also track and bridge renewals and station redecoration work.

William Denny & Bros. has received an order from the L.M.S.R. for a motorship to replace the steamer at present working on Loch Awe.

The L.N.E.R. announces the placing of large orders for sacking, oil, cloth, timber and iron. The principal items are :—225,000 yds. of jute sacking from various firms in Dundee ; 250 tons of linseed oil from a Hull firm ; 550,000 galls. of creosote oil from various firms in London, Sheffield, Darlington and Scotland ; 23,000 Scots fir sleepers from Scottish firms ; 33,100 yds. of cloth, 196,050 yds. of serge and 350,000 yds. of blue jean from various firms in the West Riding of Yorkshire and Lancashire ; 1,500 tons of pig iron from a Birmingham firm ; and 18,440 tons of cast iron permanent way chairs from firms in Nottingham, Scotland and on the North-East Coast.

D. Wickham & Co. Ltd. has received an order from the Peruvian Corporation for one No. 5 and one No. 6 petrol-driven light inspection railcars.

The Yorkshire Engine Co. Ltd. has received orders from the Mysore Railways Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for one boiler for metre-gauge M class mixed traffic 4-6-0 superheated locomotive and one boiler for 2 ft. 6 in. gauge ES class 4-6-2 superheated locomotive.

Leyland Motors Limited has received orders from the Lincolnshire Road Car Co. Ltd. for three Tiger passenger vehicles, from Sutton & Co. (Manchester) Ltd. for one Beaver-Six goods vehicle and from the New Zealand Government Railways Board for one Lion goods vehicle.

The Chinese Government Purchasing Commission on behalf of the Ministry of Railways, China, has placed the following orders, to the inspection of Messrs. Fox & Mayo, for the Canton-Hankow Railway :—

Glenfield & Kennedy Limited : 18 cast iron water columns and 600 gate valves.
Reiss Bros. Ltd. : Cast iron pipes and fittings.
J. W. Carr & Co. Ltd. : Flexible wire ropes.
Tangyes Limited : Two portable locomotive axle bearing presses.
Fellows Bros. : 48 Weston chain blocks.
Beyer, Peacock & Co. Ltd. : Two portable crankpin turning machines.
Dempster, Moore & Co. (Machinery) Ltd. : Two wet and dry tool grinding machines.
P. & W. MacLellan Limited : 24 locomotive pumps.
Easterbrook Allcard Limited : 14 tube expanders.
C. M. Hill & Co. : Six Wolf drilling machines.
J. A. Gibb & Co. Ltd. : Two steam-driven tube cleaning turbines.

The Indian Stores Department has placed the following orders :—

Guest, Keen, Williams Limited : 94,000 fishbolts and nuts, 929,000 dogspikes, and 200,000 rail keys.
W. & T. Avery Limited : One weighbridge.
Associated British Machine Tool Makers Limited : One rivet making machine.
Shaw, Wallace & Co. : 125 steel tyres.
Greaves, Cotton & Co. Ltd. : Generating sets.
Kumardhubi Engineering Works Limited : 38 20-ft. bridge girders.

The Bombay, Baroda & Central India Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

Marshall, Son & Co. Ltd. : Eleven vertical boilers.
Westinghouse Brake & Signal Co. Ltd. : 18 three-aspect colour light signals.
Worthington-Simpson Co. Ltd. : Six Duplex horizontal pumps.

Kitson & Co. Ltd. has received an order from the Crown Agents for the Colonies for one locomotive boiler for the Nigerian Government Railway.

The Egyptian State Railways Administration has placed the following orders :—

H. J. Skelton & Co. Ltd., mild steel rounds.
Turton Platts & Co. Ltd., helical springs.
Cassirer A.-G., wire.
Etablissements Duchesne, weighbridges.
Ruhrstahl A.G., tyres.

Hurst Nelson & Co. Ltd. has received an order from the Anglo-American Oil Company for 24 14-ton class A tank wagons for the conveyance of spirit.

Head Wrightson & Co. Ltd. has received an order from the Crown Agents for the Colonies for six steel underframes for freight wagons, Jamaica Government Railways.

Alfred Herbert (India) Limited has received an order from the North Western Railway of India for one Webster & Bennett 48-in. single high power boring and turning mill.

G. H. Sheffield & Co. (Engineers) Ltd., Calcutta, has received a further repeat order from the Udaipur Chitorgarh Railway for eight Sheffield Twinberrow passenger coach bogies, complete with wheels and axles, and fitted with Framwel welded axleboxes. G. H. Sheffield & Co. (Engineers) Limited, London, is to supply Sheffield Twinberrow bogies for the inspection saloon and third-class coach recently ordered by the Crown

OFFICIAL NOTICES

Bengal-Nagpur Railway Co. Ltd.

THE Directors are prepared to receive Tenders for :—

1,500 DRAWBARS.

Specification and Form of Tender can be obtained at the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after Monday, 23rd December, 1935.

A fee of 10s. will be charged for each copy of the Specification, which is NOT returnable.

Tenders must be submitted not later than Noon on Friday, 10th January, 1936.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board.
T. R. WYNNE.
Managing Director.

The Royal Arsenal, Woolwich, Royal Ordnance Factories

TRANSPORT OFFICER REQUIRED

CANDIDATES must be trained mechanical engineers and must have experience of controlling transport (railways, petrol and steam lorries, electric truck, &c.), and of maintenance of permanent way.

Age limit 30 to 45, but upper limit may, if necessary, be extended in the case of candidates already serving under the War Department.

Salary £515 18s. rising by annual increments of £18 to £634 19s. per annum. The post is pensionable, subject to probation for a period of not exceeding 2 years. Preference given to Ex-Service candidates, other things being equal.

Application forms obtainable from the Chief Superintendent of Ordnance Factories, Royal Arsenal, Woolwich, S.E.18, to be lodged not later than 13th January

South Indian Railway Company

THE Directors are prepared to receive Tenders for the supply of :—

WHEELS AND AXLES.

Specifications and Forms of Tender will be available at the Company's Offices 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company Limited, marked "Tender for Wheels and Axles," with the name of the firm tendering, must be left with the undersigned not later than 12 Noon on Friday, the 17th January, 1936.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of £1 for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, London, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
1st January, 1936.

AN Assistant Electrical Engineer is required by the London & North Eastern Railway in connection with Electric Traction Extensions; experience with 1,500-Volt D.C. Overhead Line Equipment essential. Salary £1,000 per annum. Applications, giving particulars of experience, to be sent to the Chief Mechanical Engineer, King's Cross Station, N.1.

Engineering Assistant Required by the War Office

CANDIDATES should be at least 30 years of age and must have had experience in Railway Work, including field setting-out, earthwork, and tunnelling, and be able to prepare all necessary designs, drawings, and documents. Preference given to Ex-Service candidates, other things being equal.

Salary up to £7 a week, according to qualifications and experience.

The appointment is temporary, but will probably last not less than twelve months. The successful candidate will be employed temporarily at the War Office in the first place, but will be required to proceed subsequently to the site of the works near Bath.

Application form obtainable from The Under-Secretary of State (C.5.), The War Office, London, S.W.1, and to be lodged not later than 13th January, accompanied, if possible, by samples of recent drawings and documents prepared by candidate.

Agents for the Colonies from the Metropolitan-Cammell Carriage & Wagon Co. Ltd., for the Gold Coast Government Railways, as recorded in our issue of December 20.

Craven Bros. (India) Limited has received an order from the North Western Railway of India for one Craven electrically-driven wheel lathe.

The directors of the Great Western Railway Company have authorised the placing of the following contracts :—

R. Pratt Limited, supply of three Fordson-Sussex six-wheel 4-ton chassis, and one 8-h.p. Ford saloon car.

Carrimore Six Wheelers Limited, supply of five 4 6-ton trailer chassis.

Taskers Limited, supply of five 6-ton Pole trailers.

R. A. Lister & Co., supply of three Lister auto trucks.

The Express Body & Motor Works Limited, supply of an Austin limousine, two Austin saloon cars, and a Morris saloon car.

Engineering Stores & Services Limited, the provision of central heating in new goods offices at Swindon.

Le Grand Sutcliff Gell Limited, the sinking of a bore hole between Dawlish and Teignmouth.

Vaughan Crane Company, the supply and erection of a one-ton runway and pulley block at Abergavenny goods shed.

Waygood Otis Limited, the provision of three lifts at the Great Western Royal Hotel, Paddington.

W. T. Nicholls Limited, the modernisation of certain bedrooms at Tregenna Castle Hotel.

For the Company's Swindon works :—

H. Broadbent Limited, supply of a horn block grinding machine.

Burton Griffiths & Co. Ltd., supply of a Milwaukee universal milling machine.

C. Churchill & Co., supply of two universal milling machines.

The Paulista Railway, Brazil, is enquiring for 400 all-steel box cars and ten passenger coaches, learns Reuters Trade Service from New York. This follows a previous enquiry for 200 cars. The Cerro de Pasco Copper Company has ordered 15 hopper cars from the Bethlehem Steel Company and 15 from the Magnor Car Corporation.

£85,000 SCHEME AT FLEETWOOD, L.M.S.R.—The first of six new coaling plants which form part of an £85,000 improvement scheme at Fleetwod harbour has just been erected. These six electrically-operated belt conveyors, capable of dealing with 20-ton wagons, will replace the present system of bunkering trawlers by means of cranes and buckets. Following the introduction of the new appliances, the L.M.S.R. will take over the whole of the work in connection with coal-shipping, including trimming.

IMPROVEMENTS AT DUNDEE, L.N.E.R.—An electrically-operated coaling plant is to be installed at the L.N.E.R. locomotive depot at Dundee, with overhead storage hoppers and bunkers loaded by means of a skip hoist which will raise the coal after being tipped from the wagons at rail level. The total capacity of the plant will be 300 tons, divided into two compartments, containing first- and second-class coals. A new machine shop is being erected for dealing with locomotives undergoing the heavier shed repairs, and a wheel drop will also be installed. A sand drier of the latest type is also being provided. The old engine pit is to be replaced by one 160 ft. long, and considerable work will also be involved in permanent-way alterations, earthworks, drainage, and water supply. Alterations in signalling and telegraphs are also being carried out, and additional facilities for the cleaning of carriages at Tay Bridge passenger station are being provided.

Forthcoming Events

Jan. 3 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 7 p.m. Informal Meeting.

Jan. 6 (*Mon.*).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. "The Great Western Railway Centenary."

Jan. 7 (*Tues.*).—Institute of Transport (Bristol), at Bristol University, 5.40 p.m. "The Application of Commercial Salesmanship to Transport," by Mr. H. Payne.

Institute of Transport (Metropolitan Graduate), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Inter-railway Competition," by Mr. T. Hooker.

Permanent Way Institution (Scottish), at Royal Technical College, Glasgow, 7.15 p.m. Lecture by Mr. W. Hepworth.

Jan. 8 (*Wed.*).—North-East Coast Institution of Engineers and Shipbuilders (Graduate), Bolbec Hall, Newcastle, 7.15 p.m. "Train Ferries," by Mr. P. Christie.

Jan. 9 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, in General Meeting Room, Paddington Station, 5.45 p.m. "The Great Western Railway Centenary."

Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. "The Story of a Railway Waif (the Invergarry & Fort Augustus Railway)," by Mr. H. Vallance.

Southern Railway (London) Lecture and Debating Society, at Chapter House, St. Thomas's Street, London Bridge, S.E.1, 5.45 p.m. "The Palestine Railway—its Construction and War-time Operation," by Col. W. G. Tyrrell, D.S.O.

Jan. 10 (*Fri.*).—Institute of Transport (Leeds), at Town Hall, 6.30 p.m. "The Organisation of a Municipal Transport Undertaking," by Mr. H. Godsmark.

Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "Port Economics," by Mr. A. Bown.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. Thomas Lowe Gray Lecture: "The Future of Steam Propulsion," by Mr. J. Johnson.

Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.30 p.m. "The Coasting and Continental Trades of Leith Docks," by Mr. A. Roberts.

Jan. 11 (*Sat.*).—Stephenson Locomotive Society (Midland & Northern Counties), at 4, Bury Old Road, Cheetham Hill, Manchester, 6.30 p.m. "Leicester and Swannington Railway," by Mr. P. Robinson.

Railway Share Market

The stock and share markets ended 1935 on a higher level of quotations than had been anticipated. Home railway stocks finished at about the mean level of the past twelve months although Southern preferred ordinary and London Midland and Scottish 1923 preference were notable exceptions. Both these stocks ended above the mean of the year. They have been influenced by favourable dividend anticipations. Southern preferred ordinary stock is expected to receive its full 5 per cent. for 1935 and the L.M.S. 1923 stock is being valued on the prospect of 2½ per cent. dividend for the past year.

The rating decision which may have an influence on the market valuation of the Southern preferred ordinary stock, is expected to be made known in about a fortnight's time, according to Stock Exchange calculations. Great Western ordinary stock has maintained its average price but the L.N.E.R. preferred ordinary and junior preference stocks have finished much below the middle quotations of the year.

The best record, as far as concerns market price, is held by the London Passenger Transport Board's "C" stock which ended the year at 109 which is about 18½ points above the lowest of the year and approximately the highest level touched since the stock came into existence. The stock is being favoured by many investors as an investment for the new year carrying with it attractive income yield and possibilities of capital appreciation during 1936. In the foreign railway market the end-year quotations for the principal Argentine railway ordinary stocks are much below the mean quotations of the year although current views in the Stock Exchange are inclined to be more favourable to these stocks for the coming year than for many months past.

This hopeful view is based on expectations that the Argentine political crisis will pass and that negotiations between the Argentine Government and the British Board of Trade may result in favourable changes for the railways in respect to remittances home. Brazilian issues are substantially lower on the year and notwithstanding some recovery from the lowest in San Paulo ordinary during December it ended the year about ten points below the mean level.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1934-35	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1934	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1934	Prices: Lowest 1934	Prices: Dec. 31, 1935	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili)&Bolivia	830	29.12.35	11,950	— 8,400	52	656,010	788,810	— 132,800	Ord. Stk.	26 3/4	19	20	Nil
	Argentine North Eastern	753	28.12.35	7,068	+ 560	26	210,893	193,171	+ 17,722	,,	11	6 7/8	6	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	52	45	46§	8 11/16
	Bolivar	174	Nov., 1935	6,000	+ 250	48	66,600	65,700	+ 900	6 p.c. Deb.	10	6 1/2	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	13 5/4	10 7/16	13	3 15/16
	Buenos Ayres & Pacific	2,806	28.12.35	80,729	+ 11,836	26	1,945,930	1,789,893	+ 156,037	Ord. Stk.	16 1/2	8 1/2	8	Nil
	Buenos Ayres Central	190	7.12.35	$100,000	+ $3,000	23	$2,812,600	$2,842,800	— $30,200	Mt. Deb.	23	10	13	Nil
	Buenos Ayres Gt. Southern	5,085	28.12.35	133,020	— 3,770	26	3,116,706	3,169,480	— 52,774	Ord. Stk.	35	22	18	Nil
	Buenos Ayres Western	1,930	28.12.35	44,418	+ 481	26	1,071,595	1,082,773	— 11,178	,,	27 1/2	18 1/2	14 1/2	Nil
	Central Argentine	3,700	28.12.35	125,129	+ 18,477	26	3,042,383	2,980,703	+ 61,680	,,	23	13 1/2	12	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	14	7	5	Nil
	Cent. Uruguay of M. Video	273	21.12.35	12,096	+ 3	25	249,180	403,502	— 154,322	Ord. Stk.	15 1/2	3	5	Nil
	Do. Eastern Extn.	311	21.12.35	2,215	— 128	25	41,152	43,371	— 2,219	—	—	—	—	—
	Do. Northern Extn.	185	21.12.35	1,638	+ 474	25	29,106	22,993	+ 6,113	—	—	—	—	—
	Do. Western Extn.	211	21.12.35	736	— 32	25	19,305	18,542	+ 763	—	—	—	—	—
	Cordoba Central	1,218	28.12.35	23,560	— 1,920	26	783,150	776,620	+ 6,530	Ord. Inc.	6	3	2	Nil
	Costa Rica	188	Oct., 1935	11,634	— 2,012	17	55,349	63,485	— 8,136	Stk.	30 3/4	23 1/2	34	5 7/8
	Dorada	70	Nov., 1935	13,300	+ 2,900	48	130,700	112,800	+ 17,900	1 Mt. Db.	103	95	102 1/2§	5 7/8
	Entre Rios	810	28.12.35	11,240	— 3,388	26	298,024	311,753	— 13,729	Ord. Stk.	21 1/2	12	10	Nil
	Great Western of Brazil	1,082	28.12.35	10,800	— 2,500	52	417,300	478,000	— 60,700	Ord. Sh.	7/8	5/8	1/2	Nil
	International of Cl. Amer.	794	Nov., 1935	$414,982	— $49,120	48	$4,259,092	$4,311,914	— $52,822	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	1/-	1/-	1/2	Nil
	La Guaira & Caracas	22 5/4	Nov., 1935	3,260	+ 175	48	41,145	39,150	+ 1,995	Stk.	12 3/4	7 5/8	8 1/2	Nil
	Leopoldina	1,918	28.12.35	16,754	+ 796	52	933,157	1,137,811	— 204,654	Ord. Stk.	14 5/8	7	7	Nil
	Mexican	483	21.12.35	$251,100	+ $23,500	25	$6,184,300	$5,620,300	+ $564,000	,,	3 1/4	1 1/2	5/4	Nil
	Midland of Uruguay	319	Nov., 1935	8,356	— 5,180	22	30,701	52,325	— 21,624	,,	1 1/2	1/2	1 1/2	Nil
	Nitrate	401	15.12.35	6,961	+ 630	50	146,582	129,064	+ 17,518	Ord. Sh.	3 29/32	5 1/-	2 1/4	Nil
	Paraguay Central	274	28.12.35	$2,116,000	+ $845,000	26	$53,636,000	$25,835,000	+ $27,801,000	Pr. Li. Stk.	84	67	78 1/2	7 5/8
	Peruvian Corporation	1,059	Nov., 1935	76,125	+ 17,432	22	375,790	309,538	+ 66,252	Pref.	14 1/2	8	10	Nil
	Salvador	100	21.12.35	¢22,800	— ¢6,000	25	¢329,496	¢303,052	+ ¢26,444	Pr. Li. Db.	75	70	65	7 11/16
	San Paulo	1531/2	22.12.35	21,217	— 5,438	51	1,286,730	1,391,392	— 104,662	Ord. Stk.	86	67	49	5 1/8
	Taltal	164	Nov., 1935	4,005	+ 1,780	22	16,645	11,430	+ 5,215	Ord. Sh.	2 1/8	1 7/16	1 5/8	7 1/4
	United of Havana	1,353	28.12.35	15,689	+ 969	26	400,212	421,627	— 21,415	Ord. Stk.	6	2	2	Nil
	Uruguay Northern	73	Nov., 1935	1,106	— 216	22	3,633	5,766	— 2,133	Deb. Stk.	6 1/4	3	4 1/2	Nil
Canada.	Canadian National	23,684	21.12.35	698,167	+ 81,057	51	33,709,150	32,103,883	+ 1,605,267	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78 1/4	51 1/2	65 1/2	6 1/8
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104 1/2	97 1/4	99 1/2	4
	Canadian Pacific	17,224	21.12.35	530,600	+ 23,800	51	25,245,200	24,475,800	+ 769,400	Ord. Stk.	18 5/16	11 1/16	11	Nil
India.†	Assam Bengal	1,329	10.12.35	33,660	— 6,162	36	856,014	982,345	— 126,331	Ord. Stk.	88 1/2	72	82 1/2§	3 5/8
	Barsi Light	202	10.12.35	3,322	+ 45	36	96,847	99,997	— 3,150	Ord. Sh.	10 4 1/2	9 8 3/4	7 8 1/2	6 3/8
	Bengal & North Western	2,112	10.12.35	69,891	— 3,883	36	470,069	465,269	+ 4,800	Ord. Stk.	29 7 1/2	26 2	29 9 1/2	5 5/16
	Bengal Dooars & Extension	161	30.11.35	4,169	— 722	34	94,653	105,798	— 11,145	,,	12 5 1/4	12 4	12 3 1/2	5 11/16
	Bengal-Nagpur	3,268	30.11.35	178,875	+ 8,849	34	4,202,711	3,848,353	+ 354,358	,,	10 5 1/2	9 6	10 1 1/2	3 15/16
	Bombay, Baroda & Cl. India	3,072	20.12.35	235,875	— 18,450	38	5,697,825	5,694,225	+ 3,600	,,	11 5	10 8 1/2	11 0 1/2	5 7/16
	Madras&South'n Mahratta	3,230	10.12.35	126,900	— 3,795	36	3,620,557	3,881,348	— 260,791	,,	13 1	12 2 5/4	11 5 1/2	7 5/4
	Rohilkund & Kumaon	572	10.12.35	14,016	— 431	36	82,464	85,290	— 2,826	,,	26 3	25 0	28 6 1/2	5 9/16
	South India	2,526	30.11.35	94,892	— 2,839	34	2,643,234	2,784,527	— 141,293	,,	11 9	11 5	10 5 1/2§	7 1/8
Various.	Beira-Umtali	204	Oct., 1935	65,747	+ 4,612	4	65,747	61,135	+ 4,612	—	—	—	—	—
	Bilbao River & Cantabrian	15	Nov., 1935	1,900	+ 286	48	16,953	18,333	— 1,380	—	—	—	—	—
	Egyptian Delta	622	10.12.35	9,022	+ 610	36	173,483	165,765	+ 7,718	Prf. Sh.	2 13/16	1 5/4	1 3/4	5 11/16
	Great Southern of Spain	104	21.12.35	1,808	— 652	51	91,476	115,322	— 23,846	Inc. Deb.	4	3 1/2	3 1/2	Nil
	Kenya & Uganda	1,625	Oct., 1935	193,202	+ 28,246	43	2,002,143	1,859,872	+ 142,271	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50	33	37	9 7/16
	Mashonaland	913	Oct., 1935	111,983	— 5,290	4	111,983	117,273	— 5,290	1 Mg. Db.	101	91 5/4	102	4 7/8
	Midland of W. Australia	277	Nov., 1935	14,519	— 556	22	68,781	71,429	— 2,648	Inc. Deb.	100	93	92 1/2§	5 5/8
	Nigerian	1,905	16.11.35	65,101	— 13,193	33	936,025	1,012,514	— 76,489	—	—	—	—	—
	Rhodesia	1,538	Oct., 1935	202,694	+ 13,135	4	202,694	189,559	+ 13,135	4 p.c. Db.	104 7/8	97 1/2	104	3 7/8
	South African	13,246	7.12.35	641,906	+ 76,298	36	20,321,934	18,365,439	+ 1,956,495	—	—	—	—	—
	Victorian	4,728	Sept., 1935	789,330	+ 82,793	13	2,238,853	2,139,677	+ 99,176	—	—	—	—	—
	Zafra & Huelva	112	Nov., 1935	9,907	— 1,655	48	124,030	127,888	— 3,858	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated The statements from July 1 onwards are based on the current rates of exchange and not on the par value